ACC NR: AP7000520

electrically neutral particles (neutrons for example), as well as the flow of charged particles with energies that exceeded the luminescence threshold of the Cherenkov counter radiator. The flow of γ-quanta with energies exceeding 5 Mev was approximately 2 x 10^{-3} $cm^{-2} \times sterad^{-1} \times sec^{-1}$; this value is in good agreement with the values obtained by other researchers. Orig. art. has: 3 figures. [WA-75] [IV]

SUB CODE: 04, 18/20/ SUBM DATE: none/ ORIG REF: 004/
OTH REF: 006

Card 3/3

ACC NR: AP7000520

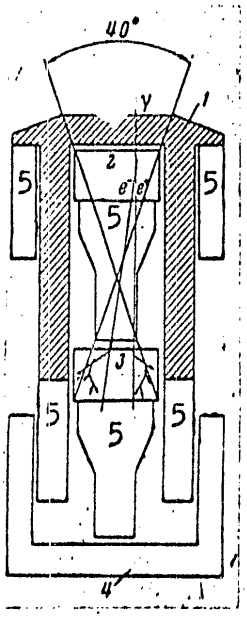

Fig. 1. Block diagram of the equipment

1 - Plastic scintillator; 2 - sandwich crystal; 3 - lead-containing glass; 4 - electronic circuits; 5 - photomultipliers.

Card 2/3

ACC NR: AP7000520 SOURCE CODE: UR/0048/66/030/011/1765/1767

AUTHOR: Grigorov, N. L.; Kalinkin, L. P.; Melioranskiy, A. S.; Nesterov, V. Ye.; Pryakhin, Ye. A.; Savenko, I. A.; Estulin, I. V.

ORG: none

TITLE: A study of high-energy γ-quanta at the upper limits of the atmosphere [Paper presented at the All-Union Conference on Physics of Cosmic Rays held in Moscow from 15 to 20 November 1965]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1765-1767

TOPIC TAGS: gamma radiation, gamma counter, gamma detection, meteorologic satellite, cosmic ray telescope, scintillator, Cerenkov counter

ABSTRACT: The satellites Proton-1 and Proton-2 carried equipment designed to detect gamma rays with energies above 50 Mev and to measure their spectrum. The equipment (see Fig. 1) comprised a telescope formed by a γ-quanta converter consisting of a sandwiched plastic scintillator, and a Cherenkov counter with a radiator made from lead-containing glass which detected the energy and direction of gamma rays. The telescope detectors were placed inside a cover made of a scintillator plastic which protected the telescope from the noise of charged particles in selecting of anticoincidences. In addition to gamma radiation, the equipment was capable of registering pulses from other

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ACC NR: AP7000521

equipment arrangement was used to detect the flux comprised of protons with E_p > 400 Mev. The geometric factor of the equipment was 133 cm²·sterad. Information from the counters was partially processed on-board and the results were sent to Earth once every 9 seconds. Preliminary data analysis shows that the proton concentration intensity varied with a period of a few tens of seconds which may have been caused by the satellite's spin about its own axis changing the pitch-angle between the measuring apparatus and the anomaly. Proton intensity however may be obtained from the envelope of a curve giving the count rate variation such as in Fig. 1. While the Proton-1 satellite could not register protons with E_p > 100 Mev, the Proton-2 could register both those with E_p > 100 Mev and those with E_p > 400 Mev protons. Judging from the average of three orbits, the ratio of concentrations of protons with E_p > 100 Mev and protons with E_p > 400 Mev varies from 18 +0.5 to 8.5 +0.2. The total measurement time for these results was 4 minutes. It is proposed that in the future the proton spectrum be measured as a function of coordinates B and L. Orig. art. has: 2 figures. [WA-75] [BD]

SUB CODE: 04,18,20/SUBM DATE: none/ ORIG REF: 002/ OTH REF: 001

Card 3/3

ACC NR: AP7000521

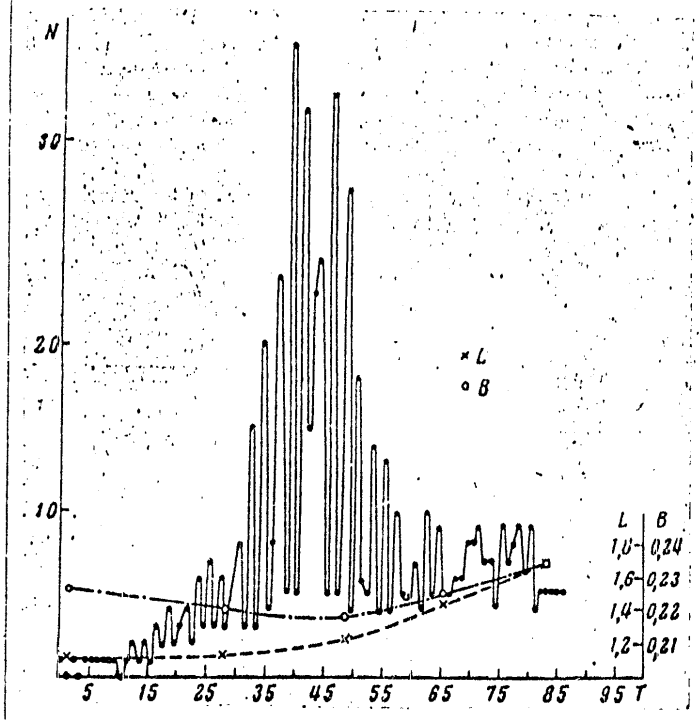

Fig. 1. Triple coincidence count rate (E_p > 400 Mev) as a function of time and coordinates L and B during one pass by the Proton-1 satellite

Card 2/3

ACC NR: AP7000521 SOURCE CODE: UR/0048/66/030/011/1768/1770

AUTHOR: Volodichev, N. N.; Nesterov, V. Ye.; Savenko, I. A.; Charvina, K. N.

ORG: none

TITLE: Study of the proton component of the inner radiation belt in the Brazilian anomaly by artificial Earth satellites Proton-1 and Proton-2 /Paper presented at the All-Union Conference on Physics of Cosmic Rays held in Moscow from 15 to 20 November 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1768-1770

TOPIC TAGS: proton counter, magnetic anomaly, proton, radiation belt, meteorologic satellite, Cerenkov counter, scintillation counter

ABSTRACT: The distribution of geomagnetically trapped protons with $E_p > 100$ Mev above the Brazilian anomaly was studied by the Proton-1 and Proton-2 satellites which repeatedly passed over that region at an altitude of 500 km. Since electrons with energies greater than 20 Mev are practically nonexistant in the inner radiation belt above the Brazilian anomaly it could be assumed that only high-energy protons were registered by the SEZ-1 apparatus, which consisted of a Cherenkov counter placed between two scintillation counters which could detect protons with $E_p > 100$ Mev and electrons with $E_e > 20$ Mev. A similar

Card 1/3

ACC NR: AP7000523

of 2.6 x 10^{-2} secondary particles/$cm^2 \cdot sec \cdot sterad$. Thus the existance of an electron flux ($E_e \geq 0.3$ Bev) of 2.2 x 10^{-2} el/$cm^2 \cdot sec \cdot sterad$ is corraborated by the SEZ-1-gathered data. Orig. art. has: 1 figure.
[WA-75]
[BD]

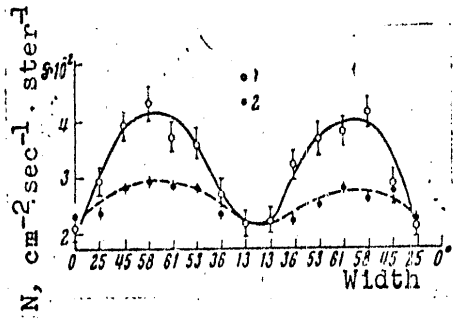

Fig. 1. Intensity of 1) electrons and 2) protons as a function of latitude. [Proton intensity is normalized with respect to the intensity of electrons on the equator].

SUB CODE: 03/ SUBM DATE: none/ ORIG REF: 005/ OTH REF: 002

Card 3/3

ACC NR: AP7000523

3) a scintillation electron energy detector which is a simplified version of an ionization calorimeter. The scintillators were placed between four 1.5 cm-thick lead plates. The pulses from the energy detector were applied to an amplitude discriminator which had 6 threshold levels. Another scintillation counter enveloped by a 12 cm-thick lead shield determined the penetration capability of particles. 4) A scintillation avalanche detector served to isolate those avalanches which were generated by primary protons but whose effect was similar to avalanches generated by electrons. Thus, the cosmic ray electrons were measured accurately even if they numbered only 0.2—0.3% of the proton total. After processing the obtained electron count data, an unexpected result became apparent for electrons with $E_e \geq 0.3$ Bev. The intensity of electrons with $E_e \geq 0.3$ Bev and protons recorded by the SEZ-12 equipment is shown in Fig. 1 as a function of latitude. Even on the equator where particles with energies less than 7 Bev/sec should not be found because of the Earth's magnetic field, 0.3-Bev/sec electrons were recorded. These, consequently, cannot be primary electrons; they are electrons which have been trapped and retained by the Earth's magnetic field. The SEZ-1 apparatus in the Proton-1 registered particles with charge $Z = 1$ and $Z = 2$ in the equatorial regions where their intensity was 1.2 (for $Z = 1$) and 2.1 (for $Z = 2$) times more predominant in the West than in the East. If it is assumed that the primary protons possess the same asymmetry, the SEZ-1 equipment recorded a flux

Card 2/3

ACC NR: AP7000523 SOURCE CODE: UR/0048/66/030/011/1773/1775

AUTHOR: Grigorov, N. L.; Klintsov, Yu. S.; Nesterov, V. Ye.; Rapoport, I. D.; Savenko, I. A.; Yakovlev B. M.

ORG: none

TITLE: Study of high-energy electrons using the Proton-1 and Proton-2 artificial Earth satellites /Paper presented at the All-Union Meeting on Physics of Cosmic Radiation held in Moscow from 15-20 November 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1773-1775

TOPIC TAGS: satellite data analysis, proton counter, electron distribution, electron flux, primary cosmic ray

ABSTRACT: The instrumentation of the Proton-1 and Proton-2 satellites included an SEZ-12 electron spectrometer which could register primary cosmic radiation consisting of electrons with $E_e \geq 0.3$ Bev. The following components were used for this purpose: 1) two scintillation counters with a differential amplitude analyzer which registered single particles with a charge $Z = 1$ moving at a relativistic velocity; 2) a gas Cherenkov counter (using Freon-13 at 11 atm) which registered particles whose energies exceeded 7 m_0c^2 (effective threshold for protons is 10 Bev) moving unidirectionally between two scintillation counters;

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ACC NR: AP7000519

coated with black paint to prevent registration of upward moving particles. The scintillation counters consisted of FEU-13 photomultipliers and plastic scintillator plates 15 mm thick. Graphs of cosmic ray flux vs. hardness (see Fig. 1) were constructed from the preliminary data on the longitudinal effect and azimuthal asymmetry of cosmic ray intensity in the geomagnetic equator region for protons, α-particles, and nuclei in the M, H, and VH groups with energies of 1 Bev for protons and in the range of 2 to 19 Bev for the remaining groups. [WA-75] [IV]
Orig. art. has: 2 figures.

SUB CODE: 04, 18/20/ SUBM DATE: none/ ORIG REF: 002/
OTH REF: 001

Card 3/3

ACC NR: AP7000519

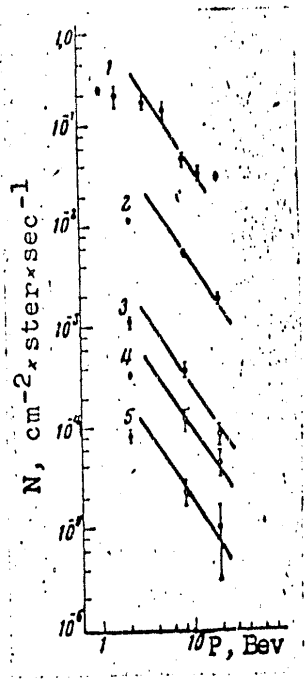

Fig. 1. Cosmic ray flux vs. hardness in the geomagnetic equator region

1 - Protons; 2 - α-particles; 3, 4, 5 - nuclei in the M, H, and VH groups.

Card 2/3

ACC NR: AP7000519 SOURCE CODE: UR/0048/66/030/011/1763/1764

AUTHOR: Volodichev, N. N.; Grigorov, N. L.; Nesterov, V. Ye.; Rapoport, I. D.; Savenko, I. A.; Yakovlev, B. M.

ORG: none

TITLE: A study made using the Proton-1 satellite of the chemical composition of primary cosmic rays in the moderate energy region [Paper presented at the All-Union Conference on Physics of Cosmic Rays held in Moscow from 15 to 20 November 1965]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1763-1764

TOPIC TAGS: primary cosmic ray, cosmic ray measurement, cosmic ray intensity, solar flare, spectrometer, Cerenkov counter, photo multiplier, scintillation counter, meteorologic satellite, cosmic ray telescope

ABSTRACT: A study, made using the Proton-1 satellite of the flux and chemical composition of solar cosmic rays generated during chromospheric flares, and of primary galactic cosmic radiation is described. A nuclear charge spectrometer with a geometric factor of 133 $\pm$6 $cm^2 \times$ sterad was used in the study. The spectrometer consisted of a Cherenkov counter placed between two scintillation counters which form a telescope. The Cherenkov counter consisted of an FEU-49 photomultiplier which made an optical contact with a Plexiglas disk 165 mm in diameter and 30 mm thick. The side of the disk opposite the photocathode was

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L 45258-66

ACC NR: AP6016330

at present only by measurement of intensity and spectra of gamma-quanta of an energy exceeding 50 Mev. The author concludes that the heavy Earth satellites Proton 1 and the recently launched Proton 2 are pioneers in the study of interactions of energies at 10 to 1000 gev. Orig. art. has: 9 figures. [GC]

SUB CODE: 03, 04, 20/ SUBM DATE: none/

Card 3/3 fdh

L 45258-66

ACC NR: AP6016330

high-level observation stations are mentioned. Problems to be solved are the very small density of cosmic ray fluxes, the need to measure the energy of primary particles, and the fact that they are usually mixed with secondary particles unless measured outside the atmosphere. The authors state that artificial earth satellites have opened the way to the use of cosmic rays for the study of super-high energies. They then describe the appearance and structure of the Proton-1 space station and the instruments it carries. They also give a detailed description of the ionization calorimeter used on Proton 1 to study high-energy particles, designed in 1954 by Professor N. L. Grigorov and produced and studied in the cosmic-ray laboratory of Moscow State University in the late fifties- and early sixties. The authors then describe the structure and operation of the SEZ-14 spectrometer for energies and charges, as well as its proportional counter and interaction detector. In order to remedy the lack of information on the energy spectrum of primary electrons, the Proton 1 carries a SEX-12 instrument to register high-energy electrons and their energy spectra. A GG-1 instrument was also installed on Proton 1 to study gamma astronomy. This study of gamma rays will facilitate obtaining information not only on sources of cosmic rays, but also on the astrophysical characteristics of inter-planetary space. Information on cosmic rays in the Megagalaxy can be obtained

Card 2/3

L 45258-66 FSS-2/EWT(1)/EWT(m)/FCC/T JKT/TT/JT/GW

ACC NR: AP6016330 (N) SOURCE CODE: UR/0026/65/000/012/0007/0015

AUTHOR: Grigorov, N. L.; Nesterov, V. Ye.; Rapoport, I. D.; Savenko, I. A.; Skuridin, G. A.

ORG: none

TITLE: Nuclear laboratory in space

SOURCE: Priroda, no. 12, 1965, 7-15

TOPIC TAGS: high energy particle, primary particle, cosmic ray, high energy electron, electron spectrum, interplanetary space, earth atmosphere, gamma ray quantum, Proton-1 satellite, Proton-2 satellite, SEZ-12 spectrometer, SEZ-14 spectrometer, GG-1 gamma ray quantum spectrometer

ABSTRACT: The author discusses various efforts made to study the microcosm from the interaction of high-energy particles and add that since no construction of accelerators of higher energies than those in operation now is foreseen for the next 10-15 yr, cosmic rays will be for a long time the only source of information on the interaction of high-energy particles. In this connection Soviet efforts in various

Card 1/3

L 9604-65 EWT(1)/FCC/EWA(h) GW

ACC NR: AR5020397 UR/0313/65/000/008/0035/0035

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 8.62.238

AUTHOR: Vernov, S.N.; Chudakov, A.Ye; Gorchakov, Ye.V.; Logachev, Yu.I.; Nesterov, V.Ye.; Savenko, I.A.; Shavrin, P.I.

TITLE: Radiation belts of the earth

CITED SOURCE: Geofiz. byul. Mezhduved. geofiz. kom-t pri Prezidiume AN SSSR, no. 14, 1964, 96-109

TOPIC TAGS: satellite, rocket, radiation effect, cosmic radiation

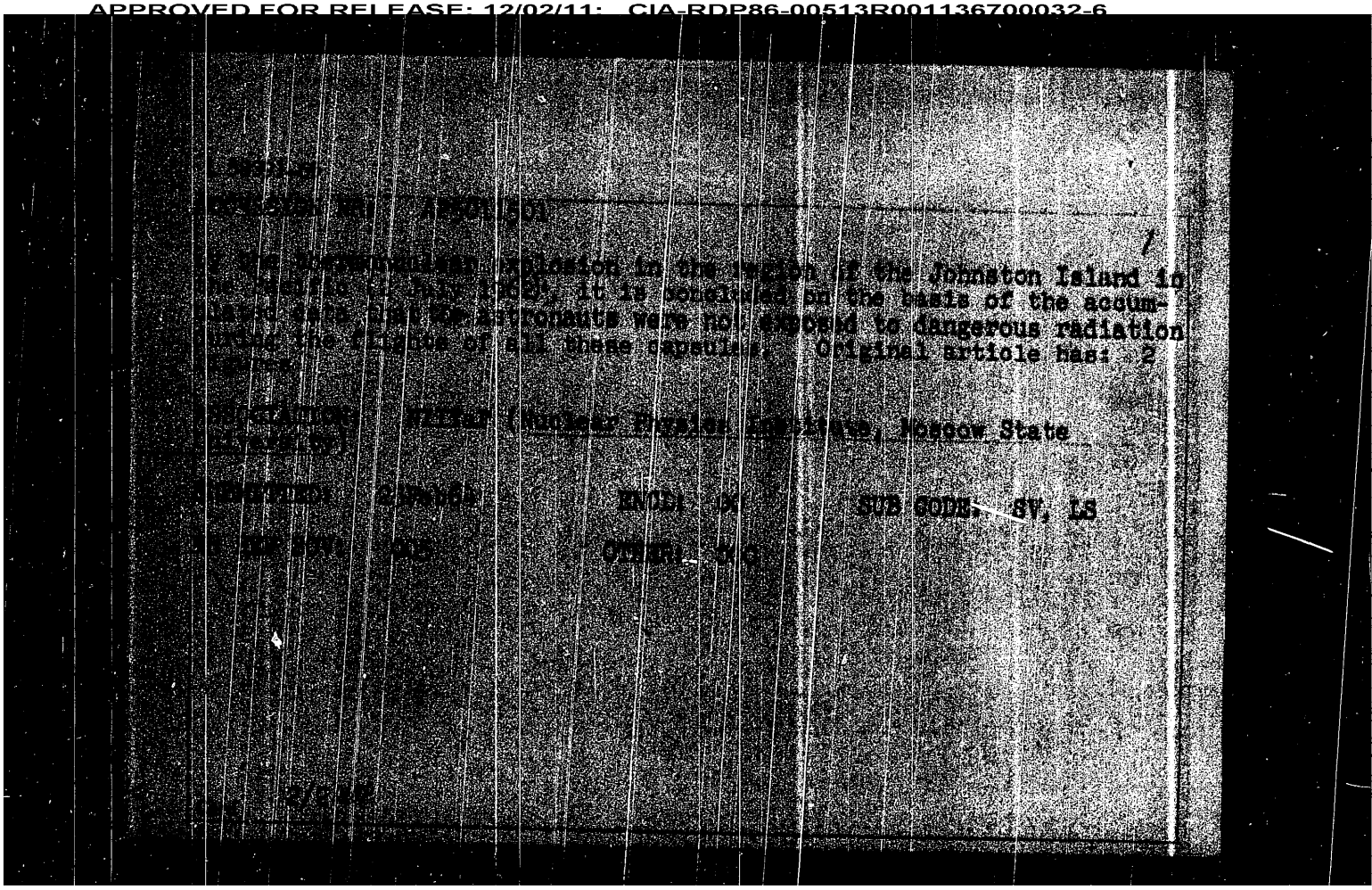
TRANSLATION: A short outline is given of the results obtained from studies conducted using Soviet artificial satellites and cosmic rockets of the radiation belts and of primary cosmic radiation beyond the limits of the magnetic sphere.

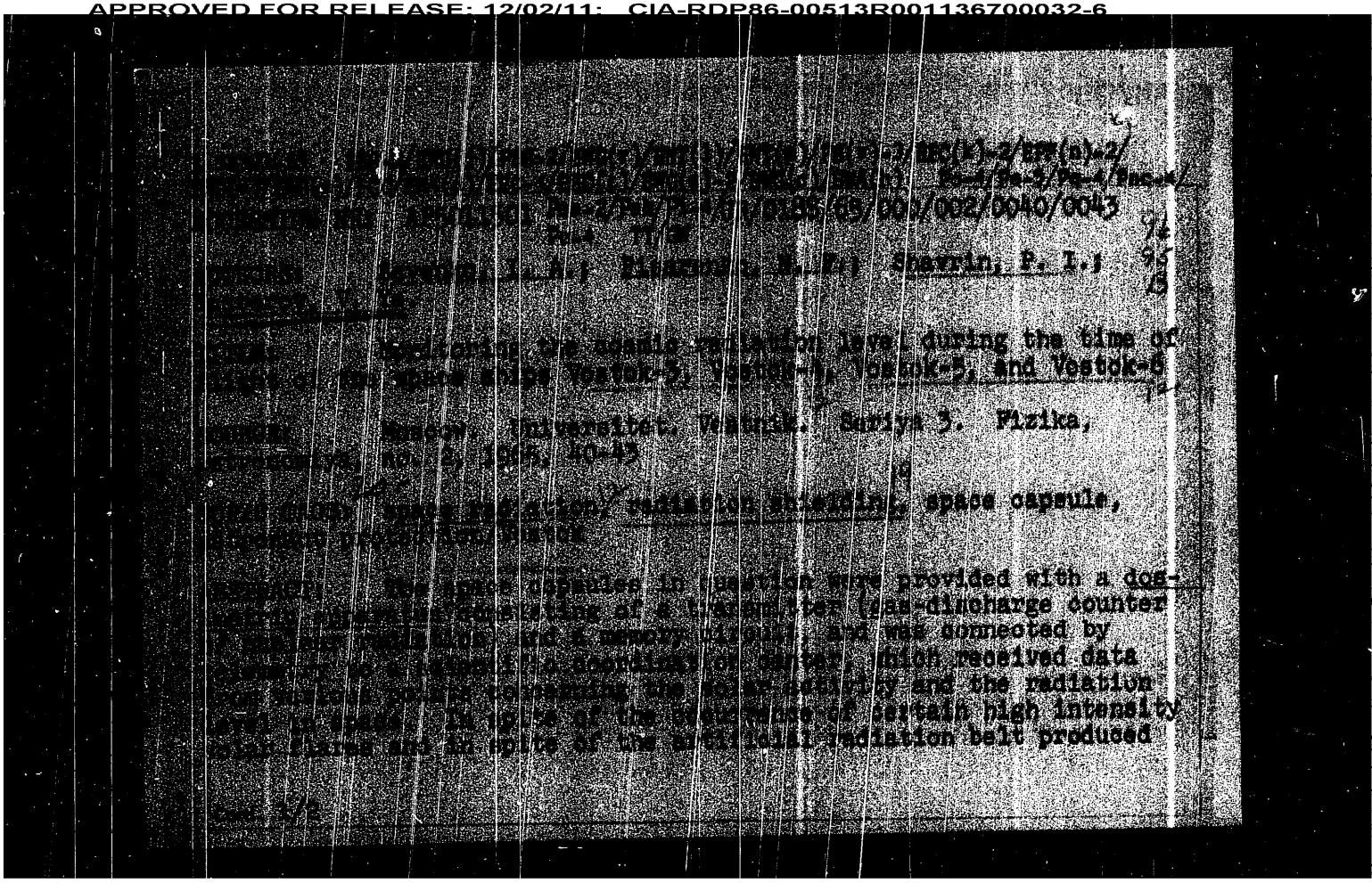
SUB CODE: 04,03 ENCL: 00

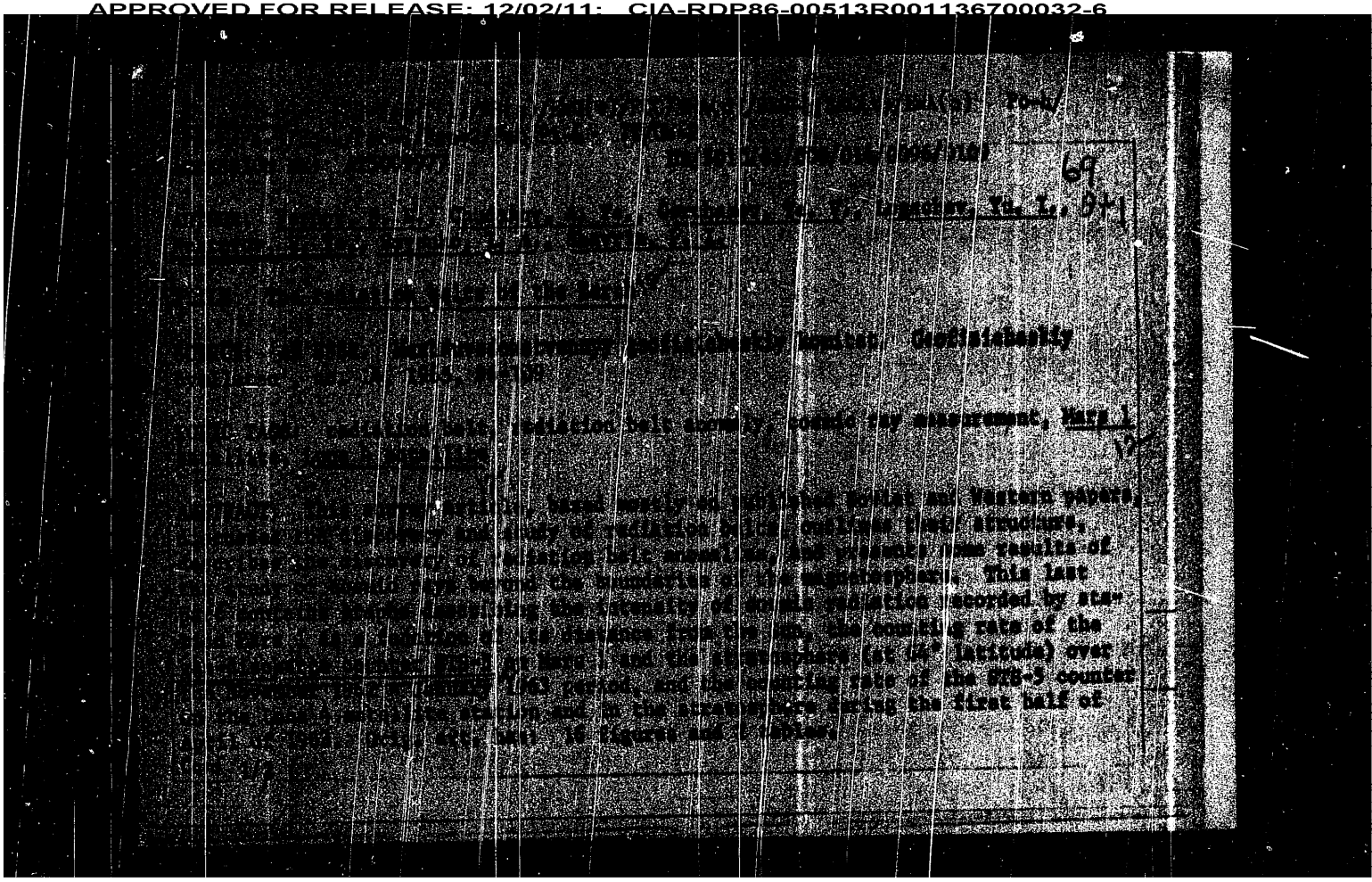
Card 1/1

GRIGOROV, N.L.; NESTEROV, V.Ye.; RAPOPORT, I.D.; SAVENKO, I.A.; SKURIDIN, G.A.

Nuclear laboratory in space; a new stage in the study of super-high-energy particles. Priroda 54 no.12:4-9 D '65.
(MIRA 19:1)







L 2403-66
ACCESSION NR: AT5023639

Van Allen belt radiation hazards comes from the radiation belt artificially created by the 1962 upper atmospheric nuclear explosions. The Voskhod-2 manned flight measured a 60 millirad dose on the astronauts Belyayev and Leonov. Furthermore, heavy damage to the space suits of astronauts may be caused by regions of soft radiation in the Van Allen belt. The third radiation hazard is the sudden, large scale, solar photospheric bursts which can generate 100-1000 rad/cm^2 radiation doses. The important protection factor here is an accurate prediction of such bursts and subsequent scheduling of space flights. Furthermore, a more accurate knowledge of solar burst physics and cosmic rays is necessary, especially an accurate knowledge of radiation spectra for high Z components, an accurate knowledge of energy and charge spectra of corpuscular radiation from solar bursts, and the time-resolution of solar bursts. Orig. art. has: 1 table. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: SV,AA

NO REF SOV: 003 OTHER: 000 ATD PRESS: 4167

Card 2/2

L 2403-66 FSS-2/EWT(1)/EWT(m)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/DD/GS/GW

ACCESSION NR: AT5023639 UR/0000/65/000/000/0568/0572

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P. I. 30 B+1

TITLE: Radiation safety problems of space flights

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 568-572

TOPIC TAGS: radiation hazard, radiation protection, Van Allen belt, cosmic ray, astronaut, solar activity

ABSTRACT: Three types of radiation hazards encountered by astronauts and space vehicles during different space missions are discussed. First are the primary cosmic rays recorded by various Soviet space probes during the 11-year solar cycle. These data show that, depending on the solar activity, the radiation dose due to cosmic rays can vary between 10 and 25 rad/year, or 40 to 100 rem/year. About 92% of this biological dose is found to be due to the heavy-particle component of the cosmic rays ($Z \geq 10$). The second radiation hazard comes from the energetic protons and hard electron radiation from the Van Allen belts. Detailed Soviet satellite observations over the years 1960-1964 indicate that a significant contribution to

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L 1539-66

ACCESSION NR: AT5023629 ENCLOSURE: 01

Table 1. Orbit parameters and times of measurement

Satellite	Perigee, km	Apogee, km	Time of measurement	Count speed pulse/cm^2/sec
Second Sputnik	306	339	19 August 1960	3.25 ± 0.15
Third Sputnik	187	256	1 December 1960	3.25 ± 0.15
Kosmos-4	298	330	26-29 April 1962	4.44 ± 0.05
Kosmos-9	301	358	27 September-1 October 1962	4.44 ± 0.17
Kosmos-12	211	405	22-30 December 1962	4.08 ± 0.25
Kosmos-15	117	371	22-27 April 1963	4.26 ± 0.14

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L 1539-66

ACCESSION NR: AT5023629

the intensity during the August—December 1960 period on the high-latitude plateau, are charted together with the recordings of "Explorer 7" and stratospheric recordings by Charakhch'yan (Geomagnetizm i aeronomiya, 3, 1963, 304; Doklad na Vses. sov. po kosmicheskim lucham. Apatity, 1964) to show a general increase of intensity by roughly 25 percent during 1961 and the first quarter of 1962. This increase is attributed to the appearance of low-momentum particles, whose integral spectrum is deduced by plotting the differentials of the increase between Kosmos-4 and Kosmos-17 and Explorer-7, and between stratospheric data and the differential spectrum of the increase according to the aforementioned satellites and Kosmos-4. The data of the Kosmos and Explorer satellites are in fair agreement but differ from those of the stratospheric measurements. It is concluded that gas-discharge counters can be used advantageously in artificial earth satellites for investigations of cosmic radiation. Orig. art. has: 3 figures. [FP]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 01 SUB CODE: AA, SV

NO REF SOV: 003 OTHER: 003 ATD PRESS: 4094

Card 2/3

L 1539-66 FSS-2/EWT(1)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/GS/GW

ACCESSION NR: AT5023629 UR/0000/65/000/000/0506/0509

AUTHOR: Basilova, R. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P.I. 44,55

TITLE: Satellite cosmic ray investigations

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 506-509

TOPIC TAGS: cosmic ray, cosmic radiation, spacecraft

ABSTRACT: Data are presented on time variations of cosmic radiation as recorded by a number of artificial earth satellites during the period between 19 August 1960 and 27 April 1963. STS-5 gas discharge counters were used as measuring instruments. The orbit parameters and times of measurement are summarized in Table 1 of the Enclosure. The recordings of the counters in each satellite were adjusted to the data of Kosmos-4 on the basis of measurements obtained within the stability period of radiation intensity during the solar activity. The data are adjusted to an altitude of 300 km. The radiation intensity changes with time, relative to

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L 3226-66
ACCESSION NR: AT5023617

1.5 ≤ L ≤ 2.1 the reverse was true. Thus, the main component of the flux of particles in the first case was protons and in the second case—electrons. It is also concluded from measurements of the change in electron intensity with altitude that the magnitude of the standard atmosphere is significantly greater than that obtained by D. G. King-Hele and M. Janice (Proc. Roy, Soc., A270, N 1343, 562, 1962). The lifetime of electrons in the artificial radiation belt created by a high-altitude thermonuclear explosion on July 9, 1962 was found to range from 170 days for L=1.3 down to about 70 days for larger L up to 2.0. Orig. art. has: 9 figures and 1 table. [04]

ASSOCIATION: none[illegible]
Moscow (All-Union Conference [illegible])

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: ES, SV

NO REF SOV: 007 OTHER: 007 ATD PRESS: 4106

Card 2/2

L 3226-66 EWT(1)/EWT(m)/FCC/EWA(h) DIAAP GS/GW

ACCESSION NR: AT5023617 UR/0000/65/000/000/0448/0454

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tel'tsov, M. V.; Shavrin, P. I.; SHARYPA, K. N.

TITLE: Investigation of the inner Van Allen belt and the artificial radiation belt of the earth at low altitudes during 1960-1964

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 448-454

TOPIC TAGS: radiation belt, Van Allen belt, magnetic anomaly, atmosphere

ABSTRACT: Investigations carried out during 1960-1964 of the inner Van Allen and artificial radiation belts of the earth at low altitudes are discussed with emphasis on the South Atlantic magnetic anomaly off the coast of Brazil. Most of the measurements of particle fluxes were made on five satellites of the "Kosmos" series and the second and third cosmic ships. It was found that in the magnetic shells $1.2 < L < 1.4$ the intensity of particles toward the east from the anomaly was greater than that toward the west from the anomaly, and for

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L 2322-66
ACCESSION NR: AT5023616

altitude versus longitude particle drift trajectory curves were obtained to explain the various geomagnetic anomalies observed. Next, data were obtained to determine the location of maxima in the outer Van Allen belt. Over a period of four years this varied within the limits $4 \leq L \leq 6$, and this variation could be associated with geomagnetic disturbances. As a third observation, an electron energy gap was discovered between the outer and inner radiation belts on $2 \leq L \leq 3$. The special profile of the outer Van Allen belt is shown to be characterized by the location of a maximum, a maximum radiation intensity I_{max}, and a half-width corresponding to $0.5\ I_{max}$. Intensity measurements and geomagnetic line-of-force cross section estimates gave the following values for the electron lifetimes in the outer belt: for electron energies > 100 kev, $T = 5 \times 10^5$ sec, for energies > 600 kev, $T = 5 \times 10^7$ sec. Orig. art. has: 13 figures and 1 formula. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: AA,SV

NO REF SOV: 015 OTHER: 012 ATD PRESS: 4107

Card 2/2 nd

L 2322-66 EWT(d)/FSS-2/EWT(1)/FS(v)-3/EEC(k)-2/FCC/EWA(h) TT/AST/GS/GW

ACCESSION NR: AT5023616 UR/0000/65/000/000/0434/0448

AUTHORS: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tverskaya, L. V.; Shavrin, P. I.

TITLE: Investigation of the upper Van Allen radiation belt at low altitudes during the flights of the satellite ships and artificial earth satellites "Kosmos" from 1960 to 1963

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 434-448

TOPIC TAGS: sputnik, artificial earth satellite, Van Allen belt, radiometry, geomagnetic field

ABSTRACT: The results of radiometric measurements of the Van Allen radiation belt from several "sputnik" and "Kosmos" satellites are discussed. The radiometers consisted of inner and outer scintillation counters and gas discharge counters. The internal scintillation counters recorded electron energies between 50 to 300 kev. Among the various recorded measurements was the variation of radiation intensity with longitude, which was quite apparent in the outer belt and which could be explained clearly by the structure of the actual geomagnetic field. Several

Card 1/2

SAVENKO, I. A.; GRIGOROV, N. L.; NESTEROV, V. Ye.; RAPOPORT, I. D.; SKURIDIN, G. A.

"Investigation of primary cosmic rays from the scientific space station Proton-I."

paper presented at the 16th Congress, Intl Astronautical Federation, Athens, 12 Sep 65.

L 2027-66
ACCESSION NR: AP5002105

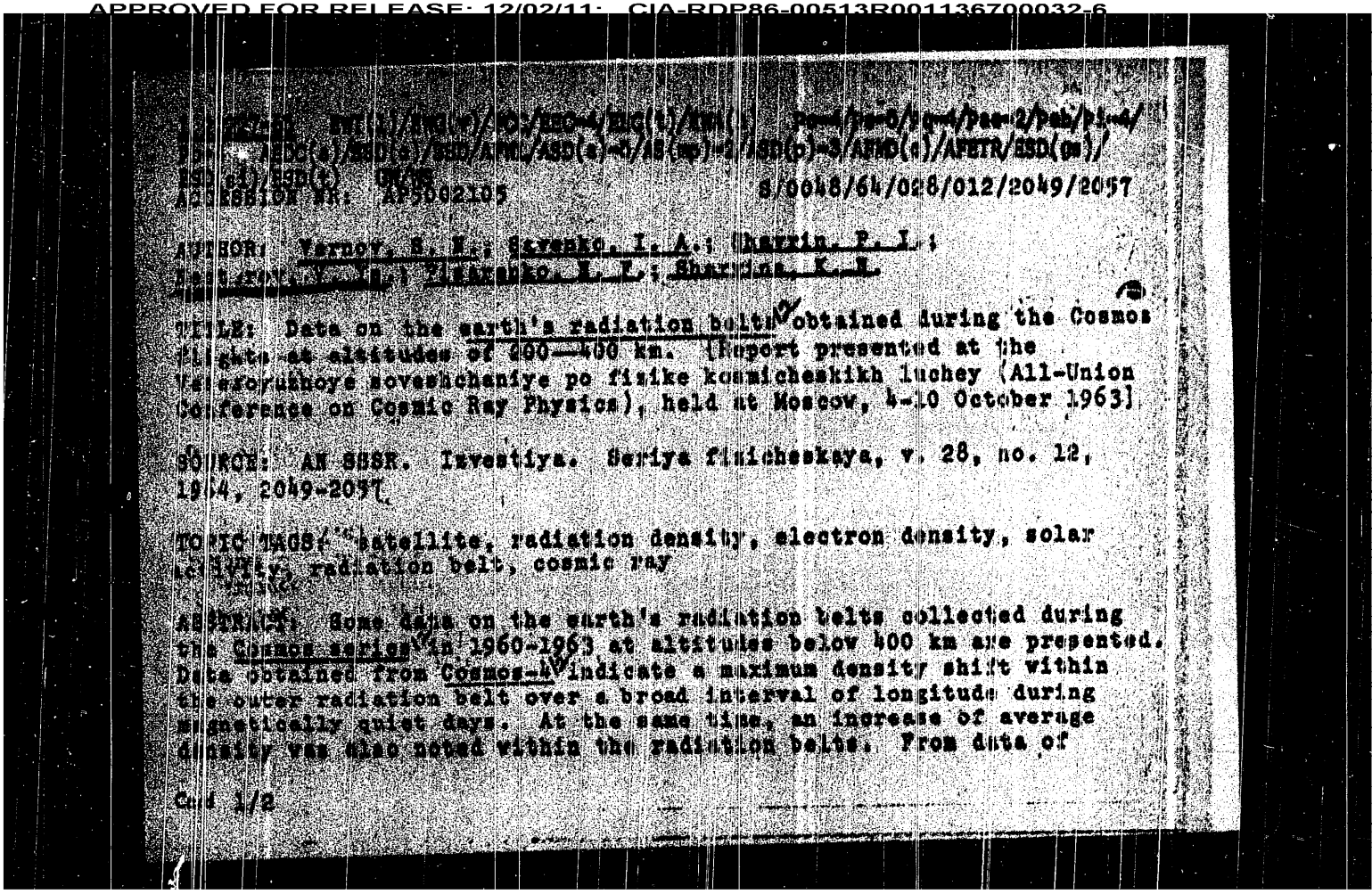
Cosmos-7 and Cosmos-12 the geographical distribution of electron density in the Brazilian anomaly at an altitude of approx 300 km was determined. This distribution roughly coincided with electron distribution in the inner radiation belt measured by Discoverer-31. The existence of electrons with energies exceeding 2 Mev within the inner radiation belt are indirectly indicated. During the flight of Cosmos-4 in April 1962, the counting rate of the Geiger counter showed a four-fold increase over satellite measurements made in August 1960. The rate of increase coincided with the proton-density change within the outer belt during the period of the transition to minimum solar activity (and decreased atmospheric density). Orig. art. has: 6 figures.

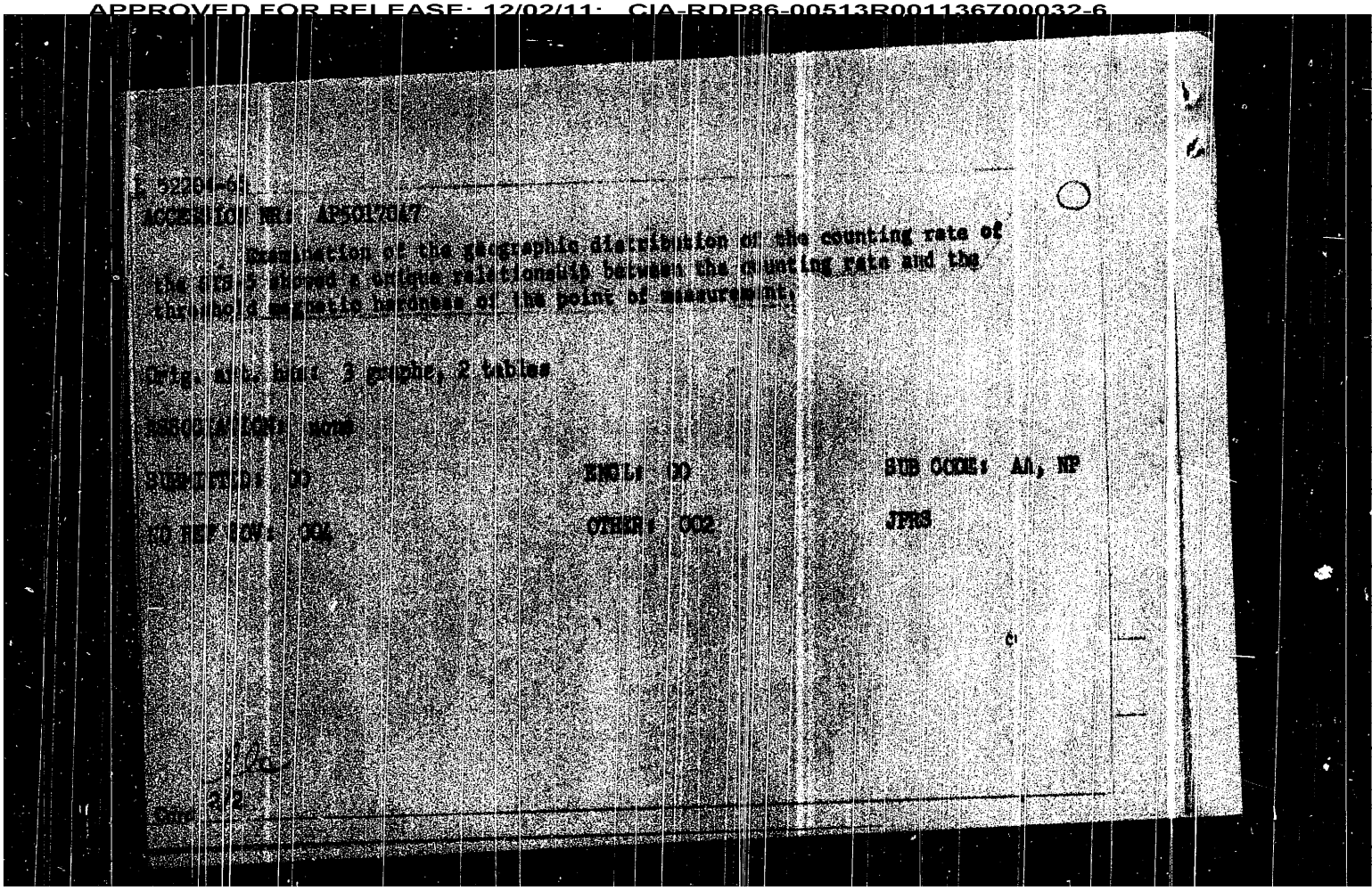
ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: AA, ES

NO REF SOV: 007 OTHER: 010 ATD PRESS: 3162

Card 2/2





L 52284-65
ACCESSION NR: AP5017047

Examination of the geographic distribution of the counting rate of the [illegible] showed a definite relationship between the counting rate and the [illegible] magnetic hardness of the point of measurement.

Orig. art. has: 3 graphs, 2 tables

SUBMITTED: 20

ENCL: 00

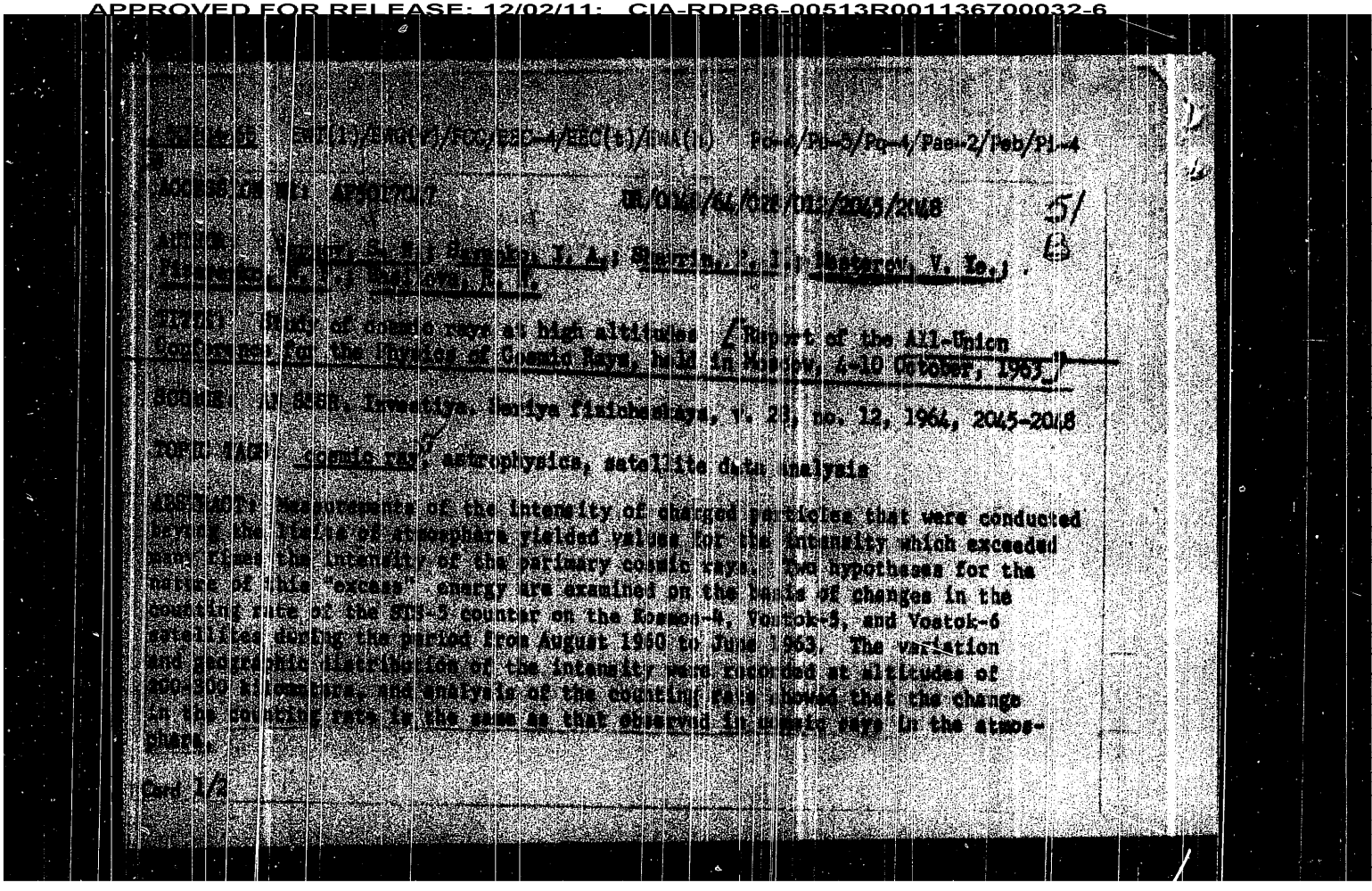
SUB CODE: AA, NP

NO REF SOV: 004

OTHER: 002

JPRS

Card 2/2



Card 1/2

ACCESSION NR: AP4041572

carried out by Cosmos 4 at magnetic levels 1.2, 1.3, and 1.45. This comparison shows an increase of protons of the energy 25 Mev in the period between the launching of these space probes. Four times more particles were counted during the Cosmos-4 flight in 1962 than in 1960 during the flight of the second space probe. The lifetime of electrons in the artificial radiation belt is different for individual levels and the intensity of the magnetic field. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 14Jan64 ATD PRESS: 3064 ENCL: 00

SUB CODE: AA NO REF SOV: 004 OTHER: 008

Card 2/2

ACCESSION NR: AP4041572 S/0293/64/002/003/0492/0497

AUTHOR: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Savun, O. I.; Shavrin, P. I.; Sharvina, K. N.

TITLE: Investigation of terrestrial radiation belts in the region of the Brazilian magnetic anomaly at heights of 235 to 345 km

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 492-497

TOPIC TAGS: magnetic anomaly, anomaly region, inner radiation belt, magnetic level, Geiger counter, electron lifetime, artificial radiation belt

ABSTRACT: A large region of high radiation intensity at the height of 300 km was detected by the second space probe at the Brazilian great negative geomagnetic anomaly. The intense radiation is caused by the sinking inner radiation belt at that height in the anomaly region; the intensity of the magnetic field at the height mentioned is less than 0.22 gs. The comparison of the counter speeds of Cosmos 4 with those of the second probe showed a more rapid decrease in the intensity of the magnetic field when the measurements were

Card 1/2

ACCESSION NR: AP4041571 S/0293/64/002/003/0485/0491

AUTHOR: Vernov, S. N.; Nesterov, V. Ye.; Savenko, I. A.; Shavrin, P. I.; Sharvina, K. N.

TITLE: Geographical intensity distribution of radiation in the region of Brazilian magnetic anomaly at the height of 300 km

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 485-491

TOPIC TAGS: artificial satellite, geomagnetic anomaly, Geiger counter, oscillation counter, isoline, nuclear burst, artificial radiation belt, radiation intensity, inner belt

ABSTRACT: Data from Cosmos 4, Cosmos 7, and Cosmos 15, which passed through the region of the Brazilian geomagnetic anomaly at the heights of 235—340 Km, have been studied. Charged particles were counted by Geiger and oscillation co ters. The results of processing are represented graphically by isolines, and the numerical values are given in a table. The numbers of the table show a difference between the two measurements. The data from Cosmos 4 were obtained before a nuclear burst in the atmosphere, and the data of Cosmos 15 were obtained

Card 1/2

ACCESSION NR: AP4034801

ENCLOSURE: 02

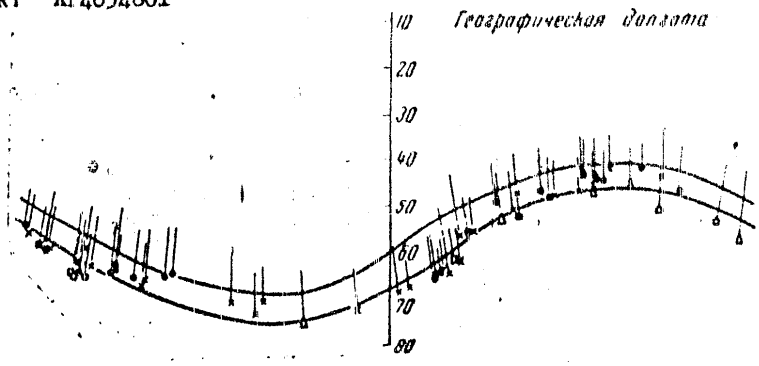


Fig. 1 (cont.) spaceships respectively; the crosses denote magnetically conjugate points for maxima measured on spaceships; the open squares denote experimentally determined points of the maxima obtained during the flight of the satellite "Kosmos-4"; the triangles denote magnetically conjugate points for maxima measured on the satellite "Kosmos-4"; the lines denote the drift paths of mirror points (at lesser latitudes for L = 3 and at greater latitudes for L = 4).

vertical: geographic latitude; horizontal: geographic longitude

Card 4/4

ACCESSION NR: AP4034801

ENCLOSURE: 01

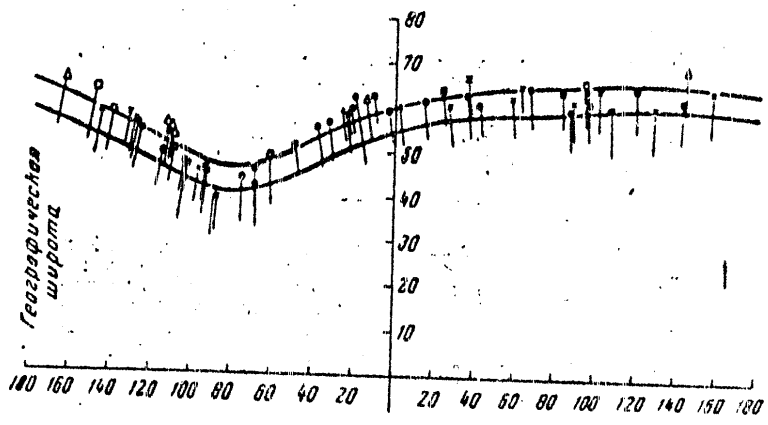


Fig. 1. Geographic position of the maxima of intensity of particles in the outer radiation belt at low heights. The filled circles and squares denote experimentally determined points of the maxima found from flights of the second and third

Card 3/4

ACCESSION NR: AP4034801

frequency of occurrence of auroras also is displaced in the direction of larger L. As a result of investigations made on the satellite "Kosmos-4" it has been found that in a broad range of longitudes there is a displacement of the intensity maximum in the outer radiation belt on magnetically quiet days in the direction of greater latitudes than is the case on magnetically disturbed days. Fig. 1 of the Enclosure shows the geographic position of the maxima of intensity of particles in the outer radiation belt at low heights. "The authors thank M. V. Tel'tsov and N. F. Pisarenko for participation in the experiment, L. V. Drozdova and O. F. Gorskaya for assistance in finalizing the data and V. Gess who furnished the maps of drift paths at various heights". Orig. art. has: 5 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 19Nov63 DATE ACQ: 20May64 ENCL: 02

SUB CODE: AA NO REF SOV: 006 OTHER: 005

Card 2/4

ACCESSION NR: AP4034801 S/0293/64/002/002/0289/0295

AUTHOR: Vernov, S. N.; Yerofeyeva, V. N.; Nesterov, V. Ye.; Savenko, I. A.; Shavrin, P. I.

TITLE: Geographic position of the maxima of particle intensity in the outer radiation belt at low heights

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 289-295

TOPIC TAGS: upper atmosphere, radiation belt, outer radiation belt, aurora, radiation intensity maximum

ABSTRACT: As a result of investigations by the second and third Soviet spaceships, the position of the maxima of intensity of particles in the outer radiation belt has been established experimentally at all longitudes. The experimentally determined intensity maxima in the outer radiation belt are situated at different longitudes approximately along the drift paths of the mirror points. However, in two ranges of longitude (from -150 to -110° and from 50 to -10°) in the northern hemisphere and in magnetically conjugate regions there is a displacement of the position of the intensity maxima in the direction of greater values L. In the first of the mentioned regions the position of the maxima of

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ENCLOSURE: 01

ACCESSION NR: ACCESSION NR: AP4034800

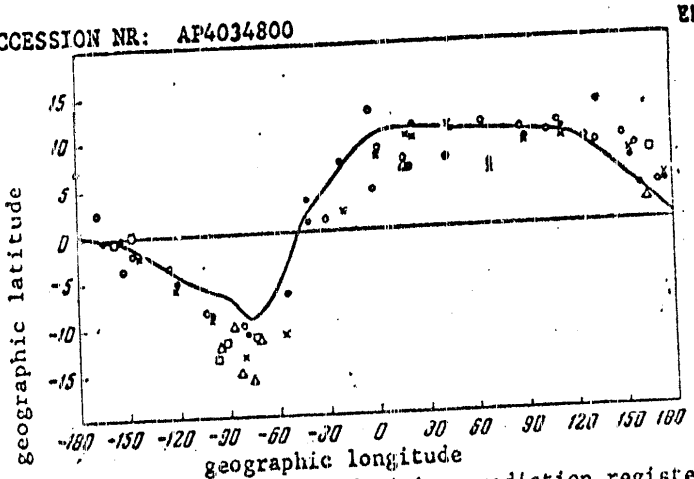

Fig. 1. Geographic positions of points of minimum radiation registered by the STS-5 radiation counters. Open circules denote the minimum counting rate of the STS-5 counter according to data from the second satellite-ship; the crosses denote the minimum counting rate of the STS-5 counter according to data from the third satellite-ship; the filled circles denote the minimum photomultiplier current according to data from the third satellite-ship; the triangles denote the minimum counting rate of the STS-5 counter counting rate according to data from the satellite "Kosmos-4"; the squares denote the minimum counting rate of the STS-5 counter according to data from the satellite "Kosmos-7"; the solid line is the cosmic ray equator as fixed by Kellogg.

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ACCESSION NR: AP4034800

primary cosmic rays. It would be difficult to explain these facts by assuming that the registered particles had diffused from the inner radiation belt. Fig. 1 of the Enclosure shows the geographic position of the points of minimum radiation registered by the counters. "The authors wish to thank Ye. A. Voronina, L. V. Drozdova and N. M. Trishkina for computation and drafting work". Orig. art. has: 5 formulas, 5 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 19Nov63 DATE ACQ: 20May64 ENCL: 01

SUB CODE: AA, SV NO REF SOV: 005 OTHER: 006

Card 2/3

ACCESSION NR: AP4034800 S/0293/64/002/002/0280/0288

AUTHOR: Basilova, R. N.; Vernon, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P. I.

TITLE: Investigation of cosmic radiation at heights of 200-350 km by the satellites "Kosmos 4" and "Kosmos 7"

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 280-288

TOPIC TAGS: artificial satellite, cosmic radiation, cosmic ray equator, cosmic rays, radiation counter, inner radiation belt, radiation belt

ABSTRACT: As the result of an analysis of the counting rate of STS-5 counters carried aboard the satellites "Kosmos 4" and "Kosmos 7", it was possible to find 13 additional points on the cosmic ray equator. A study of the geographic distribution of the counting rate of the STS-5 counters also made it possible to discover a relationship between the radiation registered by these counters and primary cosmic rays. The regular longitude variation of the STS-5 counting rates in the neighborhood of the equator, the relationship of the counting rate to the magnetic rigidity cutoff of the point of measurement and the reasonable latitude variation are all properties of the radiation registered by these counters which can be related to

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ACCESSION NR: AP4026242

30 kev at an altitude of 300 km over the equatorial zone. No regular dependence of intensity and average energy on time was observed. Orig. art. has: 1 table and 1 figure.

ASSOCIATION: none

SUBMITTED: 20Sep63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: AS NO REF SOV: 009 OTHER: 000

Card 3/4

ACCESSION NR: AP4026242

drawn from the data obtained by the 1960 satellite, Cosmos-4, launched 26 April 1962, carried an external scintillometer capable of measuring not only total energy release, but also the counting rate of particles with energies greater than 100 kev. Table 1 of Enclosure gives the counting rate N (particle/cm^2/sec), the energy release E (Mev/cm^2/sec), and the ratio E/N (kev), representing the average energy release per single registered particle. Values in the table are averaged over the flight segment falling within 10° of the cosmic ray equator for 13 crossings of the equator. As can be seen, the E/N values are of the order of 100 kev. However, if E/N actually represents readings caused by the simultaneous striking of the counter by two or more electrons with subthreshold (<100 kev) energies, then the count obtained may actually reflect a flux of 10^4/cm^2/sec with energies of 6×10^4 ev, a flux of 10^5/cm^2/sec with energies of 3×10^4 ev, or a flux of 10^9/cm^2/sec with energies of 1×10^4 ev. Since large fluxes with energies of 10 kev were not observed stationarily, the energy of the recorded electrons must exceed 3×10^4 ev. The occurrence of such electrons may possibly be related to seepage from radiation belts or electrical processes in the ionosphere. The results confirm the presence, apparently constant, of low-intensity (10^2 to 10^5 particle/cm^2/sec/steradian) electron streams with energies greater than

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ACCESSION NR: AP4026242 S/0293/64/002/001/0150/0153

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Pisarenko, N. F.; Nesterov, V. Ye.; Tel'tsov, M. V.; Yerofeyeva, V. N.

TITLE: Measurement of soft radiation in the equatorial latitudes from the "Cosmos-4" satellite

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 150-153

TOPIC TAGS: radiation measurement, radiation belt, cosmic ray equator, sputnik, satellite radiation measurement, Cosmos-4, soft radiation, count rate, energy release, corpuscular radiation

ABSTRACT: The second Soviet sputnik (19-20 August 1960) carried a scintillometer for recording intense, sporadic streams of corpuscular radiation in equatorial latitudes. Since this detector was designed to measure total flux energy of the particles and energy release within the crystal, the number of impulses was not directly recorded, and particle flux had to be determined from energy release in the scintillometer on the basis of various assumptions as to the nature of the particles involved and their average energy. To check conclusions

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ACCESSION NR: AP4026241

ASSOCIATION: none

SUBMITTED: 10Sep63	DATE ACQ: 16Apr64	ENCL: 01
SUB CODE: AM	NO REF SOV: 004	OTHER: 000

Card 3/4

ACCESSION NR: AP4026241

Primary cosmic radiation, radiation belt particles, and cosmic rays originating with solar chromospheric flares were the types of hard radiation monitored. Heliomagnetic and geomagnetic conditions were comparatively quiet during the period of the flights; a few flares not exceeding 2 points on the scale in intensity occurred, but were not accompanied by any significant corpuscular streams in the space near the Earth. Fig. 1 of Enclosure shows radiation data during a 70-hr segment of the flights. Although the dose rate on Vostok-3 and Vostok-4 was higher on orbits passing through the Brazilian and South Atlantic anomalies than for other orbits, the dose registered on Vostok-5 and Vostok-6 was linearly dependent on the time of flight for all orbits, indicating that radiation belts added little to the total dose during the latter flights. Values for both Vostok-5 and Vostok-6 fall in a single straight line, indicating a measured dose rate of 8 mrad per diem, or 0.33 mrad/hr. Comparison with the dose rate measured for Vostok-3 and Vostok-4 (14 mrad per diem) in August 1962 shows a decrease in radiation intensity at altitudes in the neighborhood of 200 km. This is most likely due to decay (at least at lower altitudes of the artificial radiation belt created by upper atmosphere nuclear tests in 1962. Orig. art. has: 1 figure.

Card 2/4

ACCESSION NR: AP4026241 S/0293/64/002/001/0147/0149

AUTHOR: Savenko, I. A.; Pisarenko, N. F.; Shavrin, P. I.; Nesterov, V. Ye.

TITLE: Measurement of total radiation dose aboard Vostok-5 and Vostok-6

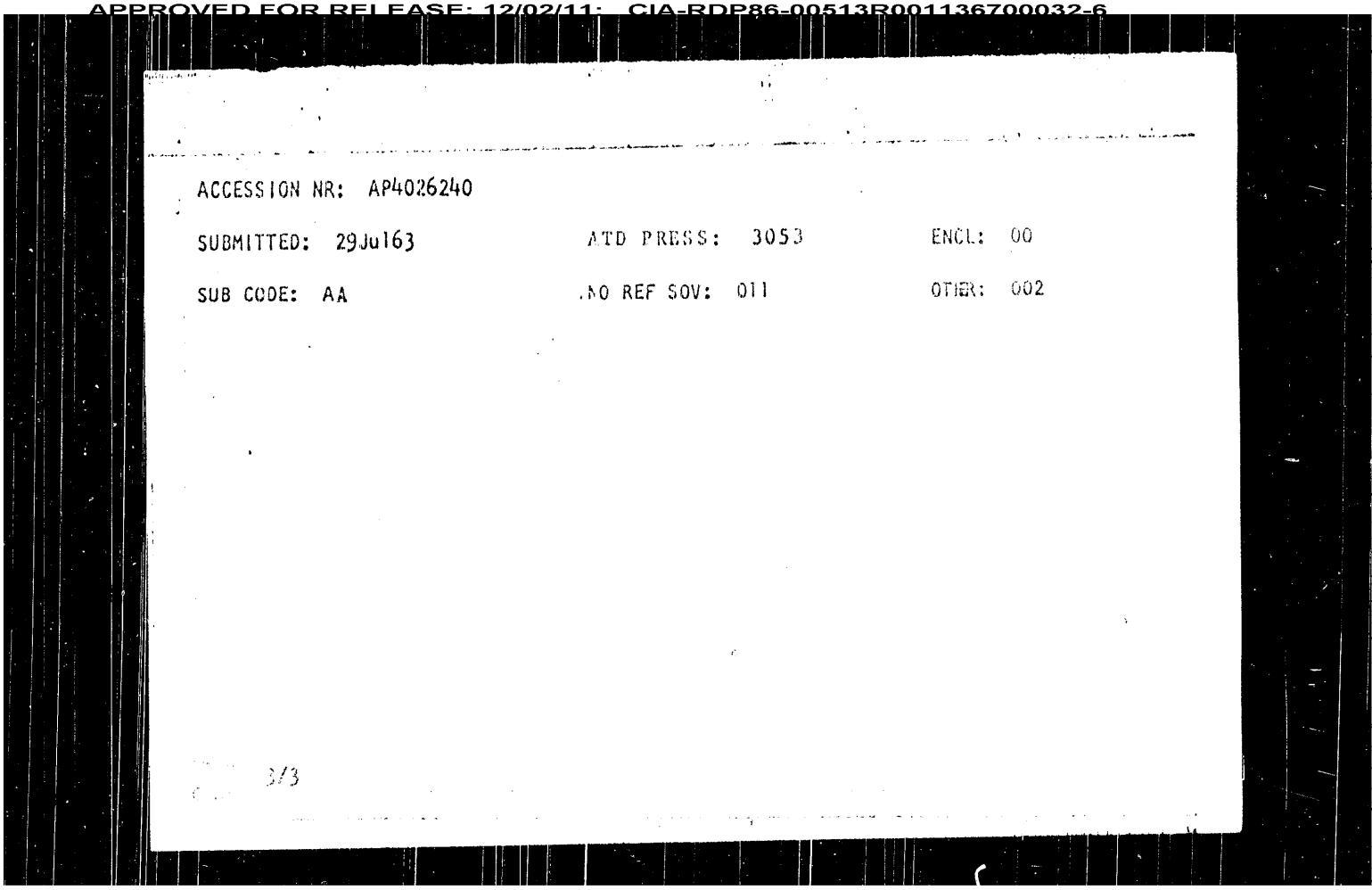
SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 147-149

TOPIC TAGS: radiation monitoring, radiation dosimetry, onboard dosimeter, absorbed dose, RBE dose, Vostok-5, Vostok-6

ABSTRACT: Data from onboard radiation meters (gas-discharge type) indicate that the total absorbed radiation dose was 50 mrad for By*kovskiy (Vostok-5, 119-hr flight) and 30 mrad for Tereshkova (Vostok-6, 71-hr flight). Flight data for the two spaceships were as follows:

	Vostok-5	Vostok-6
Orbit time	88.27 min	88.3 min
Apogee	222 km	231 km
Perigee	175 km	181 km

Card 1/4



ACCESSION NR: AP4026240

SUBMITTED: 29Jul63 ATD PRESS: 3053 ENCL: 00

SUB CODE: AA NO REF SOV: 011 OTHER: 002

3/3

ACCESSION NR: AP4026240

latitudes (magnetic rigidity greater than 5.4 Bev). These facts confirm the assumption of a genetic relationship between excess cosmic radiation recorded at heights of 200-400 km and primary cosmic radiation. Using mirror points at heights of about 350-370 km, it was possible to determine the lifetime of the particles of the artificial radiation belt as approximately 3 months. For orbits of 210-369 km the dose caused by the artificial radiation belt 20 days after its formation was almost 3 times as large as the dose caused by cosmic radiation in the natural belts. The dependence of the mean daily intensity caused by the raciation belts on height was determined. In an orbit of 207-407 km this intensity was 5.6 times as large as in an orbit of 209-301 km. The contribution to the dose by the radiation belts for satellites with an apogee of 400 km becomes equal to the dose caused by cosmic radiation. A table in the original article lists the characteristics of the radiometric apparatus carried aboard the "Cosmos" satellites; another table lists the 15 satellites and spaceships and the absorbed dose measured by each. "The authors express thanks to S. F. Papkov, Yu. V. Trigubov, O. I. Savun, A. F. Tupikin, and L. A. Smirnov for participation in developing the apparatus and making the experiments and to Prof. N. L. Grigorov for participation in discussion of the results." Orig. art. has: 2 figures, 2 tables, and 9 formulas.

ASSOCIATION: none

Card 2/ 3

APPROVED FOR RELEASE: 12/02/11: CIA-RDP86-00513R001136700032-6

ACCESSION NR: AP4026240 S/0293/64/002/001/0136/0146

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.; Pisarenko, N. F.; Tel'tsov, M. V.; Pervaya, T. I.; Yerofeyeva, V. N.

TITLE: Some results of radiometric measurements at heights of 200—400 km during 1960-1963

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 136-146

TOPIC TAGS: artificial satellite, radiation dose, radiation belt, cosmic radiation, cosmic ray, solar activity cycle, artificial radiation belt, space flight, astronaut

ABSTRACT: Measurements made by 15 satellites and spaceships (the second and third spaceships, satellites of the "Cosmos" series, and "Vostok" spaceships) during the period from August 1960 through June 1963 at heights of 175-405 km were used to determine the daily values of the radiation dose for various flight trajectories; these doses were 10-55 mrad/day and are not dangerous for astronauts when the shielding of the ship is denser than 3-5 g/cm^2. At the time of measurements in April 1962 and June 1963 it was found that there was an increase by a factor of 1.2 in the intensity of cosmic radiation in the high latitudes where the magnetic rigidity does not exceed 5.4 Bev. There was no increase of intensity in the equatorial

Card 1/3

ILLEGIBLE

NESTEROV, V. E., SAVENKO, I. A., SHAVRIN, P. I., and PISARENKO, N. F. (Acad. Sci. USSR)

"Controlling the Level of Cosmic Radiation During the Flights of the VOSTOK-3, VOSTOK-4, VOSTOK-5, and VOSTOK-6 Spaceships"

Report presented at the COSPAR, 5th Intl Space Science Symposium, Florence, Italy, 8-20 May 1964

NESTEROV, V.YE., PISARENKO, N. F., BASILOVA, R. N., VERNOV, S. N., SAVENKO, I. A. and SHAVRIN, P. I. (Acad. Sci. USSR)

"A Study of Cosmic Rays at Altitudes of 200 to 400 Km."

Report presented at the COSPAR, 5th Intl Space Science Symposium, Florence, Italy, 12-20 May 1964

NESTEROV, V. Ye.; PISARENKO, N. F.; SAVENKO, I. A.; SAVUN, O. I.; SHAVRIN, P. I.;

SHARVINA, K. N.; VERNOV, S. N.;

" A Study of the Earth's radiation belts in the region of the Brazilian magnetic anomaly at altitudes of 235 to 345 km. (USSR)".

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8-20 May 1964.

NESTEROV, V. Ye. ; SAVENKO, I. A.; PISARENKO, N. F.; SHAVRIN, P. I.;

"Controlling a level of cosmic radiation during the flights of the"Vostok-3""Vostok-4," "Vostok-5"and"Vostok-6"space ships.USSR

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy 8-20 May 1964.

APPROVED FOR RELEASE: 12/02/11: CIA-RDP86-00513R001136700032-6

SAVENKO, I.A.; PISARENKO, N.F.; SHAVRIN, P.I.; NESTEROV, V.Ye.

Radiation check during the flight of the spaceships "Vostok-3" and "Vostok-4." Kosm. issl. 1 no.1:176-173 Jl-Ag '63. (MIRA 17:4)

L 18492-63

ACCESSION NR: AP3007348

higher than the levels found by the second and third Soviet spaceships and by Cosmos 4 (26-29 April 1962); this difference was attributed to the U.S. thermonuclear test over Johnston Island on 9 July 1962. The mean daily dose as recorded by Cosmos 7 was 45 mrad, which was not considered sufficient justification for postponement of the planned Vostok 3 and 4 flights. "The authors thank S. F. Papkov, A. F. Tupikin, and L. A. Smirnov for their assistance in carrying out the experiment." Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 05May63 DATE ACQ: 21Oct63 ENCL: 00

SUB CODE: AS, SD NO REF SOV: 008 OTHER: 000

Card 3/3

counter of identical type but with the crystal protected by a layer of only 2 mg/cm^2 over 30% of its total solid angle and the rest of its surface completely shielded. In both the scintillation counters the crystals were 30 mm in diameter and 20 mm high. The first scintillation counter was placed together with the geiger counters in a common package inside the satellite, and the second was mounted in a package fixed to the external surface. The crystal counters recorded both particle count and cumulative energy levels above a fixed threshold. When gamma quanta played an important role, a comparison of geiger and scintillation counts made analysis of the radiation spectrum possible; the ratio of integral photocurrent to the pulse count gave the average energy yield for one crystal-recorded particle. Both geiger counters operated one common scaler system whose output was continuously telemetered. Data from all counters was also storable in a 100-min capacity memory which was interrogated at 40-sec and 2-min intervals from earth. Preflight calibration was made against a Cs^{137} source. Analysis of the data showed that radiation intensity in the 210- to 370-km region registered by Cosmos 7 in late July 1962 was considerably

L 18492-63 EWT(1)/FCC(w)/FS(v)-2/EDS/EEC-2/EED-2/EEO-2/ES(t)-2/ES(v)/ES(a)/ES(j)/ES(c)/ES(k) AEDC/AFFTC/ASD/AFMDC/ESD-3/APGC Pi-4/Po-4/Pe-4/Pq-4 Pb-4 TT/AR/GW/K S/0293/63/001/001/0172/0175

ACCESSION NR: AP3007348

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.; Pisarenko, N. F.; Tel'tsov, M. V. 115 110

TITLE: Cosmic radiation conditions on the eve of the flight of spaceships "Vostok 3" and "Vostok 4"

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 1, 1963, 172-175

TOPIC TAGS: cosmic radiation, space satellite, spaceship, geiger counter, scintillation counter, radiometric measurement, radiometric equipment

ABSTRACT: The following identical equipment was carried on board Soviet satellites Cosmos 4 and Cosmos 7 to measure radiation conditions along the routes of the proposed Vostok 3 and Vostok 4 flights: 1) geiger counters, type STS-5; 2) a scintillation counter consisting of an FEU photomultiplier and a CsI(Tl) sensing crystal, the latter completely surrounded by a retarding layer of more than 3 g/cm^2 [material not specified]; 3) another scintillation

Card 1/3

S/048/62/026/006/013/020
B125/B102

Radiation studies during the flights ...

Between 60° western and 60° eastern longitude the equator of cosmic radiation lies north of the theoretical sine curve. The general trend of the lines of equal cosmic radiation intensity corresponds in general to the distribution of magnetic rigidity. There are 10 figures and 2 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of the Moscow State University imeni M. V. Lomonosov).
Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

Card 3/3

Radiation studies during the flights ...

boundaries of this belt were determined more accurately by the lower orbiting Soviet spaceship. At 16 hours after the chromosphere flare of June 17, 1958 had vanished but still a few hours before the magnetic storm, charged particle intensity increased. The electron spectrum of the outer radiation belt does not change much at an altitude of 32,000-40,000 km, nor did the magnetic storm which occurred during the flight of the third Soviet spaceship have any substantial effect on the outer radiation belt. Except for a few percent, the proton intensity of the inner radiation belt remained constant during the three weeks' flight of the third Soviet satellite. The increased radiation intensity over the Brazilian anomaly, observed on board of the second spaceship at an altitude of 320 km, was due to the inner radiation belt. In this anomaly, the proton component of the inner radiation belt is predominant at small geomagnetic latitudes. The portion of X-rays increases with increasing latitude. A zone of lower bremsstrahlung intensity separates the outer from the inner radiation belt. This zone is practically absent in the region of the Brazilian anomaly. The equator of cosmic rays determined by the second and the third Soviet spaceship resembles remotely a sine curve running between 11° of northern and 11° of southern latitude.

Card 2/3

S/048/62/026/006/013/020
B125/B102

3.2420

AUTHORS: Vakulov, P. V., Vernov, S. N., Gorchakov, Ye. V., Logachev, Yu. I., Nesterov, V. Ye., Nikolayev, A. G., Pisarenko, N. F., Savenko, I. A., Chudakov, A. Ye., and Shavrin, P. I.

TITLE: Radiation studies during the flights of satellites, spaceships and rockets

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 6, 1962, 758-781

TEXT: This report deals with radiation measurements made by the second and the third Soviet spaceship, by the rocket launched toward the Venus on February 12, 1961, and by the third Soviet earth satellite (August 15, 1958). The spaceships were equipped with scintillation counters, gas discharge counters and elements for storing data through 24 hours. The northern and southern zones of increased radiation intensity are undoubtedly linked by the lines of force of the geomagnetic field. The increased radiation intensity is due to electrons of the outer radiation belt, slowed down in the jacket of the spaceship. The

Card 1/3

NESTEROV, V.Ye., kand. tekhn. nauk

Possibilities of using beta rays in irrigation and drainage investigations. Trudy VNIIGiM 38:144-148 '62. (MIRA 16:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut udobreniy i agropochvovedeniya, Moskva.
(Hydraulic engineering--Research)
(Beta rays)

S/203/62/002/001/003/019
I023/I223

Earth's radiation belts...

of the photomultiplier from 3 to 12 $\frac{\text{counts}}{\text{cm}^2 \cdot \text{sec}}$, and the energy dissipation increased from 7.5×10^6 to 3.7×10^7 $\frac{\text{ev}}{\text{cm}^2 \text{ sec}}$. When passing radiation belts the counting rate increased considerably. Graphs based on data from space-ship 2 and 3 are given. The geographical distribution of the radiation intensity as measured by the scinillation counter is also presented in a graphical form. The radiation intensity in the outer belt as measured by space-ship 2 is on the average 2.2 times higher in the southern hemisphere (average height 330km) than in the northern (average height 320km). The same ratio as measured by space-ship 3 is 4.4 (average height in southern hemisphere - 235km, in the northern - 185km). There were variations in the geographical distribution of the belts between the two flights. The proton flux decreased between the two flights. There are 6 figures and 2 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.

Card 2/3

42155

S/203/62/002/001/003/019
I023/I223

AUTHORS: Vernov, S.N., Savenko, I.A., Shavrin, P.I., Nesterov, V.Ye. and Pisarenko, N.F.

TITLE: Earth's radiation belts at 180-250km height

PERIODICAL: Geomagnetizm i Aeronomiya, v.2, no.1, 1962, 41-47

TEXT: The distribution of cosmic rays and radiation belts at the height of 307-339km were obtained by the second Soviet cosmic satellite. The third cosmic space-ship, launched on December 1, 1960 with a perigee of 180km, apogee of 250km and an inclination of 65° measured the intensity and geographical position of the radiation belts in the height range 180-250km. The apparatus consisted of a NaI(Tl) crystal (a cylinder of 14mm height and 30mm diameter) with a photomultiplier and a gas counter. The crystal counted all particles above 25kev and measured the total energy dissipation in it. The counting rates increase from the equator to higher latitudes: of the counter from 0.8 to 3.2 $\frac{\text{counts}}{\text{cm}^2 \cdot \text{sec}}$,

Card 1/3

S/560/62/000/013/002/009
I046/I242

Radiation belts of the earth...

Comparison with the findings of the second orbital spaceship shows that in the high radiation-intensity region in the Southern Atlantic the bremsstrahlung intensity has increased with the 100 km decrease in altitude and the entire region appears to have shifted to the north-west. This anomalous behavior may be due to either the magnetic storm of November 30 and December 1, 1960, or to some new phenomenon on the inner boundary of the radiation belts. The average bremsstrahlung energy for the outer-belt electrons is $E_\gamma \approx 2 \cdot 10^5$ eV; the corresponding electron flux is $2 \cdot 10^5$ particles cm^{-2} sec^{-1}. The radiation over the Brazilian magnetic anomaly is due to the protons of the inner radiation belt; the particle count in this region (Geiger counters) drops from 10 particles $.cm^{-2}$ $.sec^{-1}$ at h=320 km (orbital ship II) to 2 particles $.cm^{-2}$ $.sec^{-1}$ at h=220 km (orbital ship III). There are 6 figures and 2 tables.

SUBMITTED: September 12, 1961
Card 2/2

41906

S/560/62/000/013/002/009
I046/I242

AUTHORS: Vernov, S.N., Savenko, I.A., Shavrin, P.I., Nesterov, V.S., and Pisarenko, N.F.

TITLE: Radiation belts of the earth at altitudes from 180 to 250 km

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.13. Moscow, 1962, 67-74

TEXT: Assuming identical altitude dependence of the radiation intensity in the northern and the southern hemispheres, it is shown from measurements made on the third orbital space ship on December 1, 1960 (orbital data: perigee 187 km, apogee 265 km, inclination 65°) that the radiation intensity in the outer belt decreases by a factor of 2 between h = 235 km and h = 185 km.

Card 1/2

radiation, produced in chromospheric bursts, can present a radiation hazard. Some data on cosmic-radiation bursts during 1958-1959 are listed. Systematic forecasts of solar bursts accompanied by the emission of cosmic radiation are very important for the prevention of exposure to radiation hazard. Such a method of forecasting could be the recording of gamma radiation on the space ship. If the theory of the origin of cosmic radiation, developed by V.P. Shabanskiy and A.B. Severnyy is true, then any appearance of cosmic radiation at the moment of solar bursts ought to be accompanied by the emission of gamma radiation. Summing up, the absorbed dose-rate is strongly dependent on the inclination of the orbit, the flight altitude and the thickness of the space ship's protection. There are 10 figures and 3 tables.

S/865/62/002/000/018/042
D405/D301

Ionizing radiations ...

The geographic distribution and the magnitude of absorbed dose-rates were determined. These results were obtained by means of radiometric equipment consisting of scintillation and Geiger counters. This equipment enabled the determination of the nature of the radiation, to estimate the energy of the particles and to measure the absorbed dose-rate; by using memory devices with 24 hour storage capacity it was possible to conduct these measurements around the entire globe. The average absorbed dose-rate was 8.5 and 8.3 mrad/day for the Second and Third Space Ships respectively; the absorbed dose-rate inside the space ships varied between 0.35 and 0.7 mrad, depending on the position of the orbit with respect to the radiation belts. It was found that the proton fluxes of the internal belt in the region of the Brazilian anomaly may give a substantial contribution to the dose-rate. The average dose-rate of 8.5 and 8.3 mrad/day is not dangerous to astronauts. At 320 km the absorbed dose-rate was 40 mrad/day. The presence of primary cosmic radiation at high altitudes may lead to some specific, though rare, biological effects which are not observed at sea level. In the case of flights of not very long duration at altitudes of 200-300 km, only solar cosmic

Card 2/3

S/865/62/002/000/018/042
D405/D301

AUTHORS: Nesterov, V.Ye., Pisarenko, N.F., Savenko, I.A. and Shavrin, P.I.

TITLE: Ionizing radiations at altitudes of 180-340 km and the radiation hazard to manned space flight

SOURCE: Problemy kosmicheskoy biologii. v. 2. Ed. by N. Sisakyan and V. Yazdovskiy. Moscow, Izd-vo AN SSSR, 1962, 170-190

TEXT: The experiments, conducted on the Second and Third Space Ship yielded the following new results: An external radiation belt of the Earth was detected at an altitude of 180-320 km; its boundaries were delimited at all longitudes. The dependence of the intensity on longitude was established for the external radiation belt, the intensity increasing sharply in the South Atlantic and in other regions. A lowering of the internal radiation belt to 230-320 km was observed in the region of the Brazilian magnetic anomaly. The distribution of cosmic radiation around the globe was measured.

Card 1/3

VERNOV, Sergey N., LEBEDEV, Ye. I., GRIGOROV, V. V., SAVIN, I. A.,
CHUDAKOV, Alek Ye. and [illegible]OV, V. Y.

"The earth's radiation belt"

report to be submitted to the 14th Intl. Astronautical Cong., 16-22 Sep 63, Varna, Bulgaria.

PISARENKO, N. F. SAVENKO, I. A., CHUDAKOV, A. Ye., SHAVRIN, P. I.,
VERNOV, S. N., GORCHAKOV, E. V., LOGACHEV, Yu. I., NESTEROV, V. E.

"Investigations of Radiation During Flights of Satellites, Space Vehicles, and Rockets."

Soviet Papers Presented at Plenary Meetings of Committee on Space Research (COSPAR) and Third International Space Sumposium, Washington, D. C., 23 Apr - 9 May 62.

APPROVED FOR RELEASE: 12/02/11: CIA-RDP86-00513R001136700032-6

29008

S/020/61/140/004/008/023
B104/B108

3.2420 (1049,1492)

AUTHORS: Vernov, S. N., Corresponding Member of the AS USSR, Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Pisarenko, N. F.

TITLE: Outer radiation belt of the Earth at 320 km altitude

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 4, 1961, 787 - 790

TEXT: The second Soviet satellite whose orbit was at an altitude of 307 - 339 km had an automatic storage system which enabled it to measure continuously the radiation intensity in latitudes of ±65°. The scintillation counter consisted of a ФЭУ-16(FEU-16) photomultiplier and a NaI(Tl) crystal. The energy threshold of this counter was 25 kev. An СТС-5(STS-5) Geiger counter was also used. Measurements showed that the counting rate of the scintillation counter, from the equator to latitudes of ±40 - 50°, increased from 3 - 5 pulses/cm^2·sec to 10 - 12 pulses/cm^2·sec. In latitudes from ±50° to ±65°, the counting rate increased to 20 - 600 pulses/cm^2·sec in most cases. The authors assume that this increase in x-ray intensity is caused by particles of the radiation belt of the Earth. To prove this

Card 1/2

Equator of cosmic rays according...

radar stations on the earth. The diurnal memory made it possible to measure the latitude dependence of primary cosmic radiation each time the satellite crossed the equator. Since on large degrees of latitudes the spaceship often passed the radiation belt, only experimental points for degrees of latitude below 40° were used in order to obtain the empirical formula. The equator of cosmic rays obtained was compared with that calculated by J. J. Quenby and W. R. Webber (Ref. 7: Phil. Mag., 4, 90, 1959) by taking account of a dipole and a nondipole component of the geomagnetic field and also with the equator calculated by P. J. Kellog and M. Schwartz (Ref. 8: Nuovo Chim., 13, 761, 1959) in octupole approximation. This comparison showed good agreement within the measurement accuracy limits. The authors thank S. N. Vernov, N. L. Grigorov and I. P. Ivanenko for discussion of the results. There are 1 figure and 8 references: 1 Soviet and 7 non-Soviet. The three most important references to the English-language publications read as follows: J. R. Storey., Phys. Rev., 113, 297, 1959; M. A. Pomerantz, V. R. Potnis, A. E. Sandström., J. Geophys. Res., 65, 3539, 1960; J. J. Quenby, W.R.Webber, Phil. Mag., 4, 90, 1959.

SUBMITTED: June 7, 1961
Card 2/4

28765 S/056/61/041/003/018/020
B113/B102

3 9110 (1121, 1482)

AUTHORS: Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., Pisarenko, N. F.

TITLE: Equator of cosmic rays according to data of the second Soviet spaceship

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 985 - 986

TEXT: The use of earth satellites for determining the equator of cosmic rays from which the structure of the geomagnetic field can be determined and which permits the checking of the correctness of the theoretical and empirical approximation of this field offers a series of advantages over the measurements made on the earth. Thus, the equator of cosmic rays and especially its effect on the geophysical phenomena can be accurately studied. The second spaceship also contained a gas-discharge counter whose pulses were fed to a rate meter which was automatically interrogated by a diurnal storage system every third minute. Upon command from the earth the information stored by this system was transmitted to the

Card 1/4

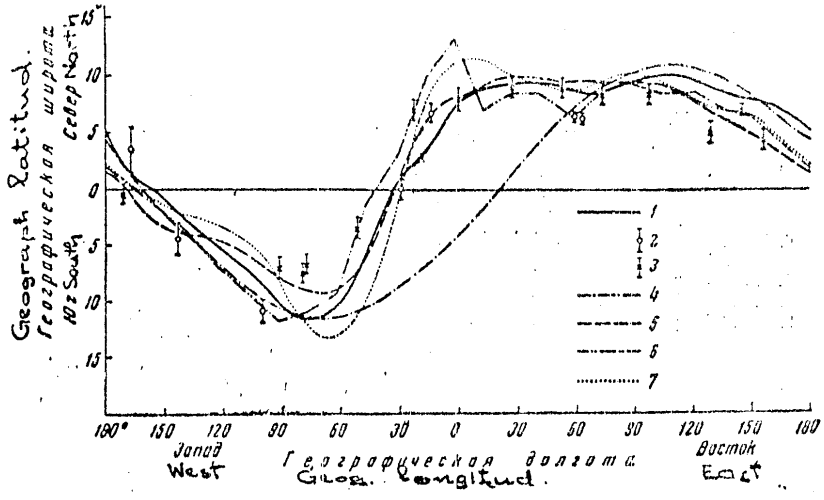
SAVENKO, I.A.; NESTEROV, V.Ye.; SHAVRIN, P.I.; PISARENKO, N.F.

The equator of cosmic rays according to the data of the third Soviet satellite vehicle. Geomag. i aer. 1 no.4:490-493 Jl-Ag '61. (MIRA 14:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, Institut yadernoy fiziki.
(Cosmic rays)

The cosmic-ray equator ...

S/560/61/000/011/004/012
E032/E514



Card 4/4

Fig.5

P.J.Kellogg and M. Schwartz (Ref.8: Nuovo cimento, 13,761,1959). There are 5 figures.

SUBMITTED: June 27, 1961

Fig.5.Legend

1 - Average results for the second spaceship (Geiger counter) and the third spaceship (Geiger and scintillation counters),
2 - Experimental results at sea level as reported in the literature,
3 - experimental aeroplane measurements as reported in the literature,
4 - equator computed on the basis of the dipole approximation of the geomagnetic field,
5 - Quenby and Webber's calculations (Ref.7),
6 - Kellogg and Schwartz's calculations (Ref.8),
7 - zero-inclination equator for the spoch 1955.

Card 3/4

150 g cm^{-2}, as described by S. F. Papkov et al. (Ref.2: Iskusstvennyye sputniki Zemli, No.9, Izd-vo AN SSSR, 1961, p.76). Pulses from the counters were fed into scaling circuits which were sampled at intervals of 3 min by a memory device with a capacity of 24 hours. In this way it was possible to measure the latitude dependence of the intensity of cosmic radiation for each transit across the equator. It is noted that the cosmic-ray intensity measured by the STS-5 counter in the polar regions and at the equator (3 particles cm^{-2} sec^{-1} and 0.7 particles cm^{-2} sec^{-1}, respectively) is in excess of the published values for this intensity (Ref.3: A.N.Charakhch'yan and T.N.Charakhch'yan, ZhETF, 35, 1088, 1958). An analogous effect was observed from the second cosmic spaceship. The discrepancy may be due (among other things) to secondary radiation produced in the envelope of the spaceship. Fig.5 shows the position of the cosmic-ray equator obtained by averaging the data obtained with the second and third spaceships. It follows from this figure that the cosmic-ray equator at altitudes of 200 to 300 km is in satisfactory agreement with the equator computed by J.J.Quenby and W.R. Webber (Ref.7: Philos.Mag., 4, 90, 1959) and the octupole-approximation calculations of

37396
S/560/61/000/011/004/012
E032/E514

3.2410
3.2100

AUTHORS: Savenko, I.A., Nesterov, V.Ye., Pavrin, P.I. and Pisarenko, N.F.

TITLE: The cosmic-ray equator according to the data obtained with the third Soviet spaceship

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.11, Moscow, 1961. Rezul'taty nauchnykh issledovaniy, provedennykh vo vremya poletov vtorogo i tret'yego kosmicheskikh korabley-sputnikov, 30-34

TEXT: It is pointed out that the use of satellites in determination of the cosmic-ray equator, i.e. the geographical position of the line of minimum intensity of primary cosmic rays, has many advantages over terrestrial measurements. In a previous paper the authors reported the determination of 22 points on this equator with the aid of the second cosmic Soviet spaceship (in only 20 hours). The apparatus mounted on the third spaceship included a gas-discharge halogen СТС-5 (STS-5) counter and a scintillation counter (NaI:Tl). The counters were placed inside the spaceship and were surrounded by a screen of between 5 and

Card 1/4

Cosmic-ray equator...

references. The 4 most recent references to the English-language publications read as follows: J. R. Storey, Phys. Rev., 113, 297, 1959; M. A. Pomerantz, V. R. Potnis, A. E. Sandström, J. Geophys. Res., 65, 3539, 1960; J. J. Quenby, W. R. Webber, Phil. Mag., 4, 90, 1959; P. J. Kellogg, M. Schwartz, Nuovo Cimento, 13, 761, 1959.

Card 3/3

Cosmic-ray equator...

physical phenomena on its position. Thereby, it is no longer necessary to introduce barometric temperature and temporal-variation corrections. The equipment of the 2nd Soviet Sputnik contained a Geiger counter, an autonomous memory-device, and telemetering apparatus. The memory device permitted measuring the latitude dependence of primary cosmic radiation at each intersection of the equator. In processing the data, the empirical formula describing the latitude dependence was constructed only from experimental points for latitudes below 40°. Twenty-two latitude curves, obtained from various intersections of the geographical equator, were used to determine the position of the minima of cosmic-ray intensity (i.e., the equator of cosmic radiation). The obtained equator of cosmic radiation is incompatible with a dipole model of the geomagnetic field. The obtained equator is in good agreement with that calculated by Quenby and Weber, as well as with that calculated by Kellogg and Schwartz. There are 1 figure and 8 non-Soviet-bloc

3.2410 (1806, 2205, 2705, 2805)

17.2400

S/560/61/000/010/006/016
D299/D302

AUTHORS: Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Pisarenko, N. F.

TITLE: Cosmic-ray equator from data obtained by means of the 2nd Soviet Sputnik

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no. 10. Moscow, 1961, 45-47

TEXT: The use of artificial satellites for determining the equator of cosmic radiation has the following advantages over terrestrial investigations: (1) many intersections of the equator at various points during a comparatively short period and (2) direct recording of the primary component of cosmic radiation--hence, the possibility of a detailed study of the equator of cosmic radiation at various moments of time, and, in particular, the possibility of studying the effect of various geo-

Card 1/3

Outer radiation belt of...

more likely than the neutron hypothesis of electron origin. [Abstracter's note: The designation "Van Allen Belt" is not used at all in the Russian text.] There are 2 figures, 2 tables and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows: E. H. Vestine, W. L. Sibley, Planet Space Sci., 1, 285, 1959; J. B. Cladis, A. J. Dessler, J. Geophys. Res., 66, 343, 1961; J. A. Welch, W. A. Whitaker, J. Geophys. Res., 64, 909, 1959.

SUBMITTED: May 23, 1961

Card 4/4

Outer radiation belt of...

of the radiation, the readings of the scintillation- and Geiger-counters were compared. Hence, it was found that the radiation in question is gamma-radiation with energies of the order of 100 - 300 kev. The mean energy of the secondary electrons arising in the single crystal by interaction with the gamma-radiation, is of the order of 10^5 ev. The clear connection between the zones of increased intensity in the Northern and Southern Hemispheres and the nature of the radiation and its energy are proof that the recorded increase in intensity is due to electrons of the outer radiation belt. In general, no direct relation was observed between the intensity and the strength of the magnetic field. This is apparently due to the short lifetime of electrons of the outer radiation belt at the altitudes under consideration compared to the drift-time around the earth. An estimate of the lifetime of electrons with E = 300 kev yielded the value of 10^6 - 10^8 sec.; hence, the hypothesis of local acceleration of electrons within the geomagnetic field is

Card 3/4

Outer radiation belt of...

latitudes of $\pm 65^{\circ}$. The scintillation counter consisted of a cylindrical NaJ(Tl)-single crystal and of the photomultiplier ФЭУ-16 (FEU-16). The Geiger counter was of type СТС-5 (STS-5), which is a halide-counter. A figure shows the radiation intensity recorded by means of the scintillation counter at various points of the globe. It was proved that the sharp increase in counting rate, which could not be explained by the latitude effect, is due to the radiation belts of the earth; this was done by analyzing the connection between the regions of increased intensity in the Northern and Southern Hemispheres, by studying the connection between these regions and the earth's magnetic field, as well as the composition and energy of the radiation. Thus, the zones of increased radiation in the Northern Hemisphere are related to those in the Southern Hemisphere by the lines of force of the geomagnetic field which determines the position of the radiation belt at an altitude of 320 km. In order to determine the composition and to estimate the energy

NESTEROV, V. Ye.

33306
S/560/61/000/010/004/016
D299/D302

3.2420 (2806, 1049, 1482)

17 2406

AUTHORS: Vernov, S. N., Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Pisarenko, N. F.

TITLE: Outer radiation belt of the earth at 320 km altitude

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no. 10. Moscow, 1961, 34-39

TEXT: The investigations carried out by means of the 2nd and 3rd Soviet artificial satellites indicated the existence of an outer radiation belt, sharply delimited by the high-latitude region. The scintillation- and Geiger-counters on board the 2nd Soviet Sputnik permitted a detailed study of the outer radiation belt in the vicinity of the earth and its delimitation as a function of longitude. The autonomous memory-device on board the Sputnik yielded continuous data on radiation intensity at altitudes of 306 - 339 km over the entire terrestrial globe for

Card 1/4

BELIKOV, M.P.; YEMEL'YANOV, V.A.; NESTEROV, V.Ye.; CHURAYEV, N.V., kand. tekhn. nauk, nauchnyy red.; SAFONOV, P.V., red.izd-va; GOL'BERG, T.M., tekhn. red.

[Using radioisotopes in hydraulic engineering] Primenenie radioaktivnykh izotopov v gidrotekhnicheskom stroitel'stve. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam, 1961. 162 p. (MIRA 14:9)

(Radioisotopes—Industrial applications)

VERNOV, S. N., GORCHAKOV, Ye. V., LOGACHEV, Yu. I., NESTEROV, V. E., PICARENKO, N. F., SAVENKO, I. A. and SHAVRIN, P. I.

"Investigations of Radiation During Flights of Satellites, Space Vehicles and Rockets"

Report presented at the International Conference on Cosmic Rays and Earth Storm, 4-15 Sep 61, Kyoto, Japan.

APPROVED FOR RELEASE: 12/02/11: CIA-RDP86-00513R001136700032-6

NESTERCV, V. Ye., Cand Tech Sci -- (diss) "Absolute measurement of the density of soils and ground under field conditions by the gammascopic method." Leningrad, 1960. 22 pp; (All-Union Order of Lenin Academy of Agricultural Sciences im V. I. Lenin, Agrophysical Scientific Research Inst); 150 copies; price not given; (KL, 22-60, 138)

SOV/89-5-6/33

Detection of Slow Neutrons by γ-capture Radiation of Cadmium When Measuring the Humidity of the Soil and Earth by Means of the Neutron Method

plate) to determine the thermal neutron density at the place of measurement. This is possible because the cadmium ratio is proportional to the thermal neutron density. The results obtained by the field test were compared with those obtained by means of a boron proportional counter SNM-5 and a special radiometer (tubes: 1K2P for cathode follower, amplifier, discriminator; tubes: MTKh-90 for scaler). The results obtained show satisfactory agreement. The fraction of the γ-radiation originating immediately from the Po-Be-source and after scattering was determined by shielding the Po-Be-source by a Cs^{137}-source of equal intensity and thus measuring direct and scattered radiation. The measuring results hitherto obtained show that n-n- and n-γ-core sampling should be carried out whenever it is intended to check the humidity of sandy and loamy soil and ground by means of the neutron method. The results obtained were discussed with Ye. G. Petrov, O. I.Fedodeyeva and V. P. Izmaylov took part in measurements. There are 5 figures and 4 references.

Card 2/3

SOV/89-6-5-16/33

21(4)
AUTHORS: Yemel'yanov, V. A., Nesterov, V. Ye.

TITLE: Detection of Slow Neutrons by γ-capture Radiation of Cadmium When Measuring the Humidity of the Soil and Earth by Means of the Neutron Method (Detektirovaniye medlennykh neytronov po zakhvatnomy γ-izlucheniyu kadmiya pri izmereniyakh vlazhnosti pochv i gruntov neytronnym metodom)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 5, pp 573 - 575 (USSR)

ABSTRACT: Cylindrical holes of different depths are drilled into each end of a lead cylinder (diameter 40 mm, height 210 mm). Into one of the two holes (depth 50 mm) a Po-Be-neutron source (1.10^6 neutrons/sec) is inserted. Into the other a halogen tube counter of the type STS-4 or STS-5, which can be screened off by means of a cadmium plate of 0.5 mm thickness, is inserted. Between the two internal ends of the holes 50 mm of lead are left. The pulses coming from the tube counter are recorded by means of a battery radiometer (a reducer with tyratrons is connected). If the measuring head described is inserted into a borehole, it is possible, from the intensity of the γ-radiation (measured both with and without cadmium

Card 1/3

Absolute Measurements of Soil and Ground Density by the Gammascopic Method

$$\rho = \frac{\ln I_0 - \ln I}{\mu x}$$

However, under field conditions, "good geometry" of experiments can not be achieved, and in "poor geometry" which actually takes place, scattered and multiply-scattered gamma-quanta hit a detector. Two methods of allowance for these scattered quanta were proposed and the following researchers participated in their application: S.I. Nosal', D.Ye. Pol'shin, I.I. Cherkasov [Ref 2], Yur'yev and Kodochigov [Ref 8], Vomocil [Ref 10-12], Feronskiy [Ref 13]. Both methods are found unsatisfactory by the author who proposes another way, namely to prevent the recording of scattered radiation by means of using scintillation counters instead of Geiger-Muller counters as detectors of gamma-radiation. The author experimented in 1957 and 1958 with a spectrometric photomultiplier of the FEU-29 type with single crystals of Na I (Tl) or Cs I (Tl), used as a scintillation counter. Cs^{137} or Co^{60} were used as gamma-radiation sources. Discrimination was made by means of an integral discriminator. Attenuation curves obtained are presented in Figure 1. The results were compared with those obtained by the conventional methods of

SOV/170-59-6-4/20

14(5)

AUTHOR: Nesterov, V.Ye.

TITLE: Absolute Measurements of Soil and Ground Density by the Gammascopic Method

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 6, pp 28-35 (USSR)

ABSTRACT: The use of the gamma-beam (gammascopic) method for determination of density of soils and grounds in their natural state makes this method more convenient and speedy than the conventional method of weighing the samples taken out of a soil under investigation. The gammascopic method is based on the exponential law of attenuation of a parallel beam of gamma-radiation which passed through an absorbing layer whose density is to be determined:

$$I = I_0 e^{-\mu\rho x}$$

where I and I_0 are intensities of the attenuated and initial beams of gamma-radiation respectively, μ is mass attenuation factor, which is approximately the same for light elements with exception of hydrogen; ρ is density of the medium, and x is the thickness of the layer. The value of density can be determined, provided that μ and x are known, by measuring I and I_0 according to the formula:

Card 1/ 3

A Hoist for a γ-Source With an Activity of up to 300 Gram Equivalent Ra for the Permanent Irradiation of Plants

Distance from the source in m	Dose in r in 4 h	in 24 h	in 1 month	during the period of vegetation
5	1.10^{1}	$2.4.10^{2}$	7.10^{3}	2.10^{4}
10	2	6.10^{1}	2.10^{3}	5.10^{3}
50	1.10^{-1}	2	7.10^{1}	2.10^{2}
100	2.10^{-2}	6.10^{-1}	2.10^{2}	5.10^{1}

There are 1 figure and 1 table.

SUBMITTED: March 24, 1959

Card 3/3

A Hoist for a γ-Source With an Activity of up to 300 Gram Equivalent Ra for the Permanent Irradiation of Plants

a concrete fundament which is firmly embedded in the ground. For the purpose of protecting the device from external damage and also from being damaged during transport, this block is surrounded by an iron mantle. Co^{60} is stored in a steel cylinder located at the lower end of the lead sealing block. This plug can be lifted by means of a motor-driven crane or hoist. Guiding within the lead block is provided. The highest position of the plug is fixed. If the crane should break down, the plug can nevertheless be made to enter the protective lead block by means of a device provided especially for this purpose.

The electric current for the driving mechanism and for signaling is supplied by a rectifier of the type USA-5A and by a 50-100 Ah accumulator.

Irradiation of the plants can be carried out with the following doses: